

Kentish

CONSIDERATIONS

ON

FACTITIOUS AIRS;

BY

THOMAS BEDDOES, M. D.

AND

JAMES WATT, *Engineer.*

PARTS IV. and V.

MEDICAL CASES
AND
SPECULATIONS;
INCLUDING
PARTS IV. and V.
OF
CONSIDERATIONS
ON THE
MEDICINAL POWERS,
AND THE
PRODUCTION OF
FACTITIOUS AIRS.
BY
THOMAS BEDDOES, M. D.
AND
JAMES WATT, Engineer.

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TO THE
S U B S C R I B E R S
TO HIS PLAN FOR INVESTIGATING THE
VIRTUES OF
ELASTIC FLUIDS,

THESE SHEETS ARE INSCRIBED BY

THE EDITOR;

IN THE HOPE THAT THEIR LIBERALITY
WILL BE THE MEANS OF SECURING AND ENHANCING TO
MANKIND

THOSE BENEFITS,
OF WHICH THE PROSPECT IS HERE HELD OUT.

Clifton, Oct. 26, 1796.

P R E F A C E.

MEDICINE is an art to which some look for health ; others for a livelihood. Unless the public be sufficiently enlightened to controul those who exercise this art, the latter principle will encroach so as to obtain too large a share in determining its condition ; and there will always be some danger, lest the advantage of the patient should be sacrificed to the interest, ease, or pride of the practitioner.

From the days of Paracelsus, to the full establishment of the reputation of the Peruvian bark, there subsisted a constant struggle between persons desirous of introducing new substances into medical use, and their opponents. Potentates and national councils are well known to have taken an eager part in the dispute. Physicians in possession of the public confidence, were almost invariably on the side of opposition ; but very seldom from certain knowledge or rational belief of the unworthiness of this or that article to be admitted into the *Materia Medica*.

Controversies of such a nature appear to be for ever laid asleep. When a new substance comes from the Antipodes, if it bring with it a passable character, there is now scarce a physician who will hesitate to receive it into his prescription, or an apothecary into his shop. Had the Editor of these communications been content with advising the trial of *sal sodæ* pills in the cases of paupers afflicted with calculus; of wood sorrel for scrophulous sores; and of bodies containing loosely combined oxygene for sea-scurvy, the most squeamish son of Hippocrates would never have felt himself scandalized at his proceedings.

To what is this advance in liberality to be ascribed? Doubtless, in part, to the increase of knowledge, and to that habitual reference of opinion to experiment, by which the most knowing are kept in modest remembrance of their ignorance. But I have sometimes suspected the agency of an auxiliary cause; and the pride of birth having yielded to the spirit of commerce, why may not the same spirit of commerce have contributed to tame the no less stubborn pride of useless erudition?

That this sort of facility extends as far as the LOVE OF GAIN will allow, and very little further, I had sufficient reason to be convinced, long before I found myself in a situation to measure arguments with the enemies to investigation in medicine. If a profit can be got by furnishing or directing an article, what, among a generation, whose supreme good is gold---can be more in order, than that there should be at once persons ready to furnish and direct? But there may be more trouble than profit in furnishing the article, or in learning

ing how and when to direct it. In such case, what again can be more in order, than for those who are too busy or too idle to take an interest in improvements, to decry it; though they may not chloose to assign precisely their reason for so doing?

A critical examination of our stores of health would furnish me with various instances for my opinion. I will adduce one. The living body is powerfully affected by heat and cold. But the means we have of applying them, either universally or partially, are disgracefully barbarous in a country, where mechanics and chemistry have been carried to such a pitch of perfection. Their clumsiness, where they are at hand, often deters from their use; and such as they are, they are often, in remote situations, not to be had. I could point out a variety of savage tribes, that have exerted their intelligence and fancy, with admirable effect, on utensils subservient to their most pressing necessities. In civilized communities, the accumulated stock of genius and dexterity is applied to no such vulgar purpose. It is well if it keep pace with the demands of fashion. How little the health or welfare of human beings is an object of the arts at large, seems sufficiently proved by observing, that the apparatus described in the different parts of this publication, is probably the first considerable piece of mechanism invented exclusively for the purposes of the physician. On this subject were I to propose a question to the most unexorable advocate for things as they are, I should not be afraid of a dissenting answer. *Would it be amiss, if, against the exigencies of disease, every parish or township were furnished*

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nished with every such instrument and convenience as is at present known ; and with such also as human ingenuity, exerted for this express purpose, shall be able, from time to time, to devise? But here is no obvious source of profit. The groans of the sick form no part of the budget ; and Ministers cannot (or perceive not that they can) secure themselves in office by efforts to ease the pangs by which those groans are excited. In the mixed mass, called the public, there are not a sufficient number of leading individuals aware of the recompence which they might reap in self-approbation, if they would make it a principal pursuit to inform themselves how their fellow men may be best protected against personal suffering ; and if they would unremittingly exert themselves till such protection becomes a ruling principle in social institutions.

I doubt whether the stricture was sincere—but it has been objected to me, that I have written for the general reader, and not merely for the members of the profession to which I belong. I might reply, that without influencing many minds, I could not hope, during the longest life, to see any satisfactory progress made in the enquiry which I wished to have set on foot without delay. I might add, that although I am perfectly careless about the class of substances to which a remedy belongs, there were very sufficient reasons for writing more at large, and in a popular manner, when the subject was so entirely new. The principles on which the trial of gasses in medicine ought to proceed, were perhaps not very accurately known to the senior part of the faculty ; they were nearly as well understood out of the profession as in it : and
the

the less analogy any method bears to those commonly employed, the more pains will be requisite to satisfy the scrupulous of its innocence. I have sometimes met with invalids ready to swallow, upon trust, in any quantity, medicines with which they were entirely unacquainted; but suspiciously inquisitive as soon as gasses were mentioned.

But these narrow reasons were not those which had most weight with me. I desired to be instrumental in diffusing a taste for the most useful species of knowledge, and in converting nations into HUMANE SOCIETIES. There is an art, not suspected by the multitude to lurk among possibilities, and never yet cultivated by any people, although its honorable title was usurped by a system of intercourse, once established among the French. This is the *art of living*; for whose reception men's minds can only be prepared, by being familiarised with just ideas concerning animal nature; and whose precepts can issue only from the shrine of Hygeia.

THE DEGREE of credit due to the several reports in this series and its precursors every reader must determine by his own judgment. I have been anxious to procure unquestionable evidence of the gross result. I have always requested that the patient might be solicited to allow his name and designation to appear. These, in my opinion, however, add little to the credibility of a narrative, unless the method of treatment be at the same time specified. I have omitted no endeavour to procure from the patient himself a description of his own feelings;

feelings ; and I have frequently been so fortunate as to obtain the attestation of a second professional person ; and of such an one as cannot be imagined to have any species of interest in the favourable issue of the process.

With whatever severity the facts be scrutinized, it must, I think, be admitted, that artificial gasses have, by themselves, been eminently serviceable in some of the most deplorable and most hopeless of disorders. I may refer, in proof of my assertion, to the first of the following reports. In various other instances the respiration of a modified atmosphere has probably assisted towards a cure. I am led to think so by comparing accounts from different quarters. It seems placed, by their concurrence, beyond doubt, that with common care, the administration of airs is as little hazardous as of any powerful drug whatever. The efficacy of oxygene is not least conspicuous, where it has most disagreed. I have published all the facts I could procure of this kind ; they will serve useful admonitions : and is it not to be hoped, that by the ingenious they may be hereafter applied, to some valuable purpose ?

In proportion as facts are more easily ascertainable in surgery, I feel more confident that the juice of sorrel will not disappoint expectation. It is for experiment to give permanent importance to this application.—It however owed its first importance to hypothesis. Had I not been previously considering the possible agency of oxygene in the living system, I should never have listened with so much interest to that account of the effects of sorrel, which observation of the frequency of scrophulous complaints in the centre of Ireland led me to enquire

enquire out. I trust also that charcoal will answer to the idea which some of my correspondents have given of its virtues.

These inferences may be questioned upon very different grounds. Scepticism is sometimes associated with ardour of enquiry, sometimes with lethargic supineness. The following pages will not speedily find a reader more systematically incredulous than their author. For I see not how, without sincere scepticism, it is possible, in any department, to avoid error : or how without curiosity it is possible to attain truth.

As the lazy imbecility of fashionable physicians has sometimes sought refuge in supine scepticism, I shall quote from a writer of authority, a passage in which this disposition is well characterized. It is, universally, an object of just disapprobation ; but in medicine the public cannot be taught to consider it with too great abhorrence.

“ There are some men of narrow views and grovelling
 “ conceptions, who, without the instigation of personal
 “ malice, treat every new attempt as futile and chimerical ; and look upon every endeavour to depart from
 “ the beaten track, as the rash effort of a warm imagination, or the glittering speculation of an exalted
 “ mind, that may please and dazzle for a time, but can
 “ produce no real or lasting advantage.

“ These men value themselves upon a perpetual scepticism ; - - - - - upon inventing arguments
 “ against the success of any new undertaking ; and, when
 “ arguments

“ arguments cannot be found, upon treating it with contempt and ridicule.

“ Such have been the most formidable enemies of the great benefactors of the world ; for their notions and discourse are so agreeable to the lazy, the envious, and the timorous, that they seldom fail of becoming popular, and directing the opinions of mankind.”

The diffusion of philosophical or experimental truth has, however, very nearly emancipated men from that thralldom under which Dr. Johnson here represents them as labouring. The editor's own experience entitles him to make the remark. And to those whom the mere awe of prescriptive absurdity restrains from beneficial exertions, it may be encouraging to be told, that the entire want of all those advantages, on which the success of physicians is usually calculated, has not deprived him of a large share of public attention and confidence. But, if he had no correspondent in town or country to consign him patients; no religious sect or great man to enrich and degrade him by their patronage ; from the younger part of the faculty, and from men of inquisitive minds, he has experienced perfect good will. This he considers, with regard to both parties, as an implied declaration, how unavailing they deem all known means against the most terrible of our domestic evils ; and in general, how poor in its pomp they have found medicine.

Hitherto .

Hitherto the editor has merely endeavoured to discover, in nature and accident, the vestiges of a path, along which art may proceed to an end which she has never yet reached. He is perfectly sensible, that he has brought very little to bear. In putting out of his hands the present pamphlet, which he intends as the last of the series, he thinks it due to his readers to make this declaration of his pretensions.

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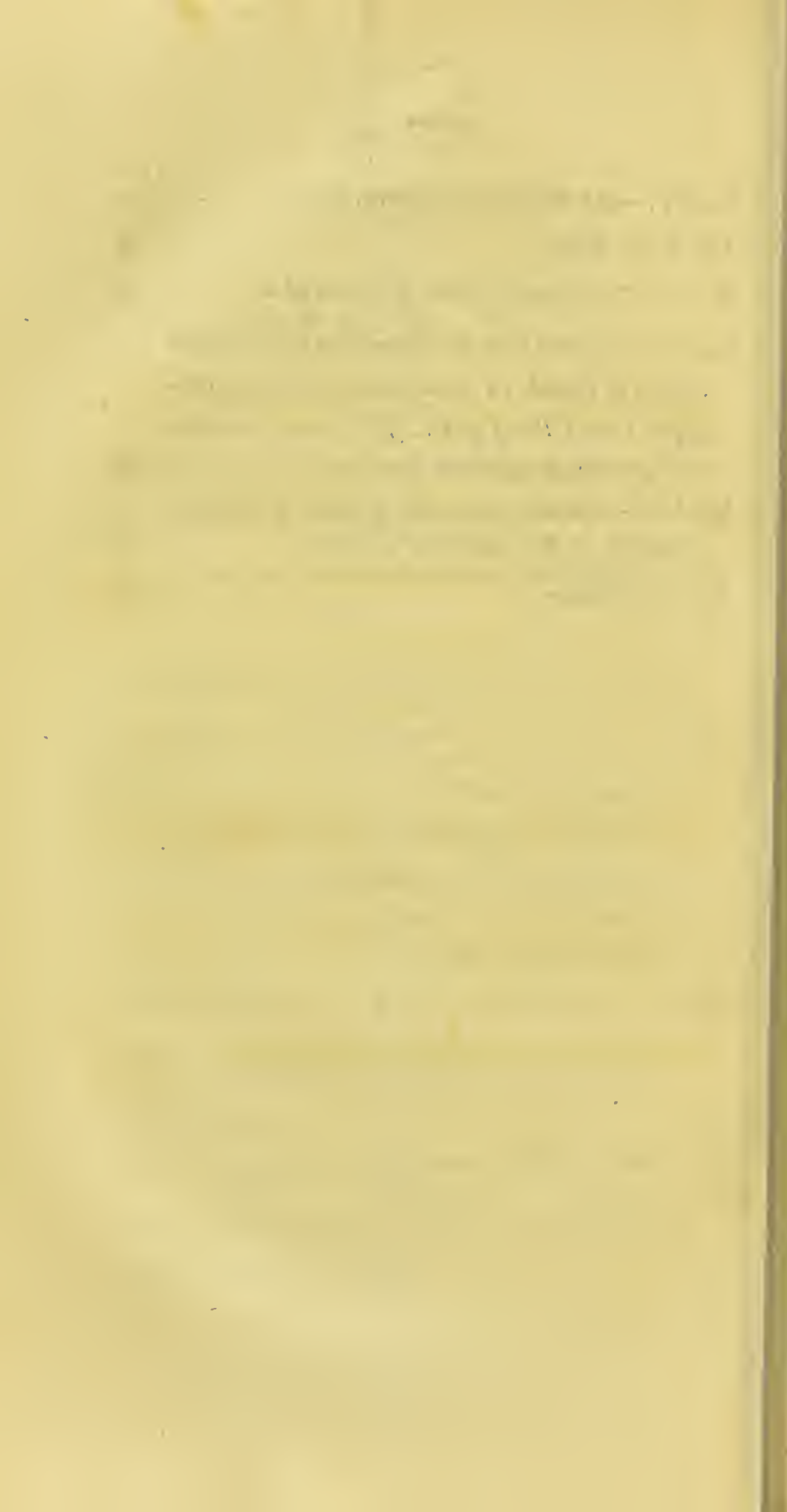
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SELECT CASES.

CASE I.

OF

PARALYSIS FROM YELLOW FEVER,

IN WHICH

Diluted Oxygene Gas or Air was employed.

THE UNIVERSITY OF CHICAGO

JULY 1953

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PART IV.

CASE I.

CAPTAIN HEMSLEY, ætat. 24, commanded a transport in the service of Government, which went to the West-Indies with Sir Charles Grey's expedition. The company consisted of seventeen men and boys, fourteen of whom died from the ravages of the yellow fever. In the month of June, 1795, he was attacked by the same fever; but, being ordered to England, the ship was re-manned, and during his being ill of the fever the ship sailed. As ships, by steering to the North, quickly change their climate, it produced such an effect upon him, that his existence was preserved; it could hardly be termed more: the use of the lower limbs was entirely lost, and the mental faculties were so much impaired, as to make his friends despair of his recovering either his powers of body or mind. In this state he arrived in England in August, 1795, and was under the care of the faculty at Gosport for about six weeks. After ineffectually using every means recommended by them, they advised his father to take him to Bath, instead of which he put him on board a vessel, and brought him to Sunderland. In the beginning of December,

1795, his father brought him to Newcastle, to see if the use of the Vapour Bath would render him any service : his situation on his arrival here was nearly as above stated ; his feet and legs were considerably swelled from extravasated lymph, and the knees contracted from the rigidity of the flexor tendons—these parts felt below the ordinary temperature of his body, and were very insensible to the touch. Mr. Abbs, with whom I have the honour to be connected in business, agreed with me in thinking that the Vapour Bath might be of use. at least in procuring a relaxation of the rigid tendons ; accordingly we ordered him to use the bath three times a week : this he continued for a month, from which he found considerable relief—the swellings of the feet disappearing—and the tendons relaxing, so as to allow every species of motion ; but still there was no recovery of voluntary motion, nor any additional power. We gave him calomel in small doses ; but so small a quantity affected his mouth, that he received little or no benefit from its use. The bath having performed its duty, by increasing the activity of the absorbents, and restoring flexibility to the joints, not being attended with any further beneficial effects, was desisted from, and the use of tonics, both general and local, were had recourse to ; partial bathing to the feet, stimulant liniments, and electricity, wine, bark, and steel—these had an apparent good effect for some days, and then their power seemed to cease ; we therefore thought of giving the oxygene gas. This being mentioned to a medical friend (Dr. Ramsay), he coincided in the opinion ; accordingly, on the 1st of February, 1796, he took two quarts of oxygene, diluted with eighteen of atmospheric air. After drawing in half a dozen inspira-
tions,

tions, he found a glow spreading over the whole surface of the lungs, and said he felt as if going to break into a sweat upon the neck and chest. As that part of the nervous system which retained its power, seemed possessed of great mobility, might not this sensation arise from sympathy of the external with the internal surface, as we sometimes observe such consent between the stomach and the skin? The sense of heat continued for about a quarter of an hour, and he felt nothing more from this dose: it was repeated every morning, with his expressing nearly the same sensations. On the fourth morning his urine was much loaded, and deposited a copious sediment, of a reddish flaky matter, resembling brick dust. Sixth day; says he thinks his legs lighter, i. e. in lifting up either of his legs, which he does by putting both his hands round his thigh above the knee, he uses less exertion, therefore we hope he has more power of motion in the leg: he has for some years been subject to a scorbutic eruption upon his face, which since his taking the gas is rather better, and appears drying with brawny scales. Eighth day, describes the sensation he feels from the circulation of the blood in his leg, which he says sometimes stops suddenly, and then rushes on again: he describes the circulation so accurately, that the internal coats of the vessels appear to give him the sensations which he expresses. Does not this plainly shew that the blood in its passage through the lungs, under the influence of a highly oxygenated atmosphere, receives an increased degree of vitality, which it slowly unfolds to the other parts of the system?

The attendants about him observe a great change in his conduct; for though a sailor, he seemed to want the fortitude that class of men are generally possessed of,—
nor

nor had he that degree of jocularity, but at present his spirits are much better. Tenth day, the glow continues longer—nearly half an hour; the circulating sensation continues, and is much more frequent; his spirits increase, and he says he feels such a change in himself that he begins to have hopes of recovery.—Fourteenth day, he gathers strength of body, and his mind partakes, from the same cause, a greater degree of energy; his memory is much more perfect, and his answers are given with such a degree of quickness, in comparison with his manner previous to the taking the gas, that he scarce appears the same individual.—Sixteenth day, the urine has ceased to deposit, and as his strength encreases, the sympathetic effect upon the skin gradually decreases,—he is now enabled to stand with the assistance of crutches and his back supported against the wall. From being so long (seven months) accustomed to lie in bed, and sit on low seats, when standing erect, his head swims like a man upon a precipice, unused to such situations.—Eighteenth day, his strength increases in his limbs, and his vertigo not so considerable; can take a few steps sideways upon his crutches, and his back against the wall.—Twentieth day, recovers daily—ventures a few steps from the wall upon his crutches; when his stockings are off, his toes are perceived to have a weak voluntary motion; his face continues the same, and his spirits remain good. Twenty-third day, continues to improve—can get off his chair alone, and walks about his room on crutches—expresses a great desire to be allowed to come down stairs, in which he is indulged; it is the first time since he has been here, which is between two and three months—seems highly delighted with the change, as he expresses himself, he feels he gets better every hour;—the gas in the same quantity (2 quarts to 18) is still continued.—

Twenty-

Twenty-eighth day, the weather being fine, he is allowed to walk in the garden; the muscular fibre which was very much relaxed, has greatly recovered its tone—particularly the calves of the legs, which were so soft as more to resemble bags of oil than muscular fibres, are now possessed of that tension which bespeaks health and strength. March 3d. continues to improve, except that his feet and legs are a little stuffed in an evening; as the Vapour Bath, previous to the use of the gas, took away the œdema from the legs, he is to use it again. March 6th. Since he was in the bath his legs have not been so much swelled—in every respect continues to improve—the pulse has not been mentioned in this case, though it was attended to, but in a chronic case it seemed a little necessary; it will be sufficient to remark, that at the time of beginning the use of the oxygene, his pulse was about 100 strokes in a minute, low, and weak; that immediately upon his taking the first dose of gas, his pulse beat from 8 to 10 strokes in a minute slower, and appeared a little more expanded; in the course of an hour or two it returned to the usual standard, with this difference, that as he gathers strength the immediate effect is not so great, and that now the usual state of the pulse instead of being from 100 to 110, is only from 80 to 90. March 10. 'Continues to get better—can now walk for some time in the garden upon his crutch.—March 15. He now uses a great deal more exercise; complains of a numbness of the right hand arm. On investigation, this appears to have arisen from his remaining longer than usual upon his crutches, which were not sufficiently stuffed to prevent the compression upon the brachial nerve, and the large vessels of the arm.—March 20. From removing the cause of his numbness, the effect has ceased; continues the gas, which is now increased to
three

three quarts.—April 9. No bad symptoms arising from the continued use of the gas, and as at present he appears stationary, it is thought advisable to give the same dose twice a day.—April 20. The increased dose seems to have been of considerable use—has made more progress; he can now walk with the assistance of two sticks—is in great spirits—entertains no doubt of getting well. May 6. Is now so well, and the season so fine, that we have advised his father, who lives by the sea, to take him home for the benefit of sea-bathing, which we hope will perfectly restore him.

*Extract of a letter (inclosing the preceding Case), from
MR. KENTISH, Surgeon, Newcastle upon Tyne.*

SIR,

I likewise inclose a letter from my friend Dr. Ramsay of whose attendance and advice I profited during the whole of the case. I wished his testimony as well as my own, for we are sometimes led to be too partial, where we are anxious for success. This first essay has induced the faculty of the Infirmary here to order an Apparatus; and, as my partner (Mr. Abbs) is the senior surgeon, I shall have an opportunity of seeing its effects in surgical cases. Several, related both in the 1st, 2d; and 3d parts of your Considerations, would induce us to hope for considerable aid from it. When I am further acquainted with the result, I will inform you of it, when I hope to have some more observations to communicate. I shall hope to hear of your receipt of this; and I have the honour to be,

Sir, your obedient humble servant,

Newcastle, June 6, 1796.

J. KENTISH.

CASE

Letter from DR. RAMSAY.

SIR,

IT gives me pleasure to have an opportunity of adding my testimony to Mr. Kentish's, of the efficacy of oxygen gas, in the case of Mr. Hemfly.

I saw the patient after the fruitless administration of the remedies enumerated, and was asked whether he appeared a proper subject for a *first trial* of Pneumatic Medicine here. Anxious for a trial under less unfavourable circumstances, I hesitated for a while. Hopeless however as the patient's situation seemed to be, I at length approved of the attempt, as failure could not lessen my confidence in its general utility ; and aware that success in this instance would to others afford proof indubitable of its efficacy.

The case as drawn up by Mr. K. presents a faithful and accurate state of facts. The conjunction of cause and effect, that is, the administration of the remedy and amendment, has seldom appeared more distinctly in the employment of any medicine in any disease than in the present instance. The zeal which Mr. K. has uniformly shewn for the advancement of medicine, and his readiness in adopting every means that promise to promote that end, entitle him to the thanks of every friend to science.

I am, Sir,

Your very humble servant,

Newcastle upon Tyne,
June 10, 1796.

JOHN RAMSAY.

To Dr. Beddoes.

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CASES II, III, IV, V.

OF

EPILEPSY.

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ASTOR LENOX TILDEN FOUNDATION

Case II. is reprinted, with some alterations, from a pamphlet entitled, 'Letters from Dr. Withering, and other Correspondents;' which pamphlet is now out of print, and not likely to be re-published. The fact I think too curious to be lost; and if, with Cases III and IV. in which oxygene air was also prejudicial, it should serve to enlarge our knowledge of a disease always so terrible, and often so hopeless, there will be little reason to regret the untoward effects produced by oxygene, which were very transitory; and what if by the rule of false, we should arrive at a successful method of treating some of those cases, in which oxygene aggravates the fits or brings them on?



CASE II.

ABOUT three years ago, a person, aged 20, took an excursion on the mountains of Switzerland. In the night he dreamed of falling from a precipice, and was seized, as appeared from severe bruises on his hands, with a strong convulsion fit. Valerian and other medicines, called *nervous*, were administered. Sea-bathing disagreed with him; and after cold-bathing in fresh water his fits suddenly increased from one or two in a week, to 28 in 24 hours. On discontinuing the cold bath, they diminished in frequency, and have not, for a long time, exceeded 12 in the day and night.

The fits differ greatly in violence. The more violent, which he terms *stomach fits*, render him insensible;
and

and continue from one to three minutes; and he is torpid for about ten minutes afterwards. These fits occur only in the night. The slighter fits also occur more frequently in the night. He will often be attacked but once or twice in the day, and eight or ten times in the night. These slighter fits last from 10 to 15 seconds; the patient being quite sensible, and frequently speaking with perfect knowledge of what is passing, though indistinctly. The instant they are over he is quite well or rather relieved. If seized, when on his legs, he falls with force; and of his muscles, some become rigid, some convulsed. On his chair, he may have a fit without the knowledge of a stranger, sitting in the same room. For a long time he was continually drowsy and a fit was brought on by looking up to any height or down from it, as also by the smallest effort of attention, even by reading a single line. But none of these circumstances now affect him. His appetite and spirit he has always retained; and his faculties are said not to be impaired.

A celebrated physician attempted to stop his fits by large doses of opium administered towards evening and during the night. But the first two grains produced frantic paroxysm, during which eight persons were necessary to secure the patient. This state lasted 18 hours all which time there was no fit, but during the subsequent debility, they were more severe than usual. The same remedy was tried a second time, under circumstances somewhat different. The effect and the nature of the malady are thus stated by the practitioner, who prescribes it:—The patient “ seldom sleeps more than an hour without experiencing a convulsive fit, which ceases in about half a minute without any subsequent torpor.—

Larg

Large doses of opium only prevented the paroxysms, so long as they prevented him from sleeping by the intoxication which they induced. Other medicines had no effect on him. He was gently awakened every half hour for one night, but without good effect, as he soon slept again; and the fits returned at about the same periods of time, for the accumulated sensorial power, which occasioned the increased sensibility to pain, was not thus exhausted."

It having been suggested that modified air possibly might be useful, I could only say that I hoped we could manage so as to do no permanent mischief, but I could by no means vouch that the patient should not experience some temporary inconvenience. The wish to be relieved from so distressing and helpless a condition overbalanced this apprehension.

The physician, whose words I have just quoted, thought of a reduced atmosphere as most proper to be tried first. But I was induced by false analogies to try oxygene diluted with common air. The patient inspired a mixture of three parts of the latter with one of oxygene, for ten minutes at going to bed. As I then used Mendip manganese, the quantity of oxygene must be considered as less than the numbers would otherwise imply, because that manganese yields much azotic gas at the end of the process, and because the carbonic acid, which the calcareous spar it contains, was not probably all washed away. No effect being observable, next night (Saturday night) he was desired to respire for 20 minutes; afterwards he felt an agreeable glow in his chest. On Monday night, at three intervals, he respired for half an hour. I ordered him now a saline draught with 20 drops
of

of antimonial wine; and I requested that he would drink three glasses of wine instead of four, which was his usual quantity. On Tuesday night he respired for 20 minutes. On Wednesday the air was omitted by way of precaution. On Thursday, as no suspicious effect appeared, and as he passed good nights, and for two of these days had no fits, he was ordered a mixture of oxygene one part, atmospheric air two parts; and of this he respired for half an hour, and felt uncomfortably hot afterwards. In the morning his pulse was 72, and of natural strength. He coughed slightly, but found himself very well. He had no fit all Friday. A relation who had watched him with great tenderness ever since the commencement of his indisposition, thought him better, and wrote a favourable account to his distant friends. Towards night the patient was unusually lively, but quite composed in intellect. The respiration of factitious gas was omitted, as I had originally determined to wait the event as soon as any distinct change should have taken place. He had scarce lain down in bed when he was alarmed with startings of the abdominal muscles, as I imagined from his description. This had ceased before my arrival, but I found him flushed and with a pulse rather strong, and above 100. He had a constant propensity to motion, but was easily persuaded to exert himself to keep still. As he was never left alone, I was quite certain that he had taken no stimulant. His wine had been dropped this day. He appeared however as if at once a little intoxicated and alarmed. A slight fit now intervened, and increased his apprehensions, for he had begun to flatter himself that this would prove the crisis of his complaint. As he had no evacuation all day, a gentle cathartic was given, and soon operated properly. In the night he had a frantic attack,

similar

similar to that which opium had produced the first time ; only far milder, and accompanied with singular agitations of the muscles, which was a new circumstance. His lower extremities were frequently in action, and his toes would move, like the fingers of a person playing on the harpsichord. Sometimes, as he was sitting on his bed, he would lift up his feet, and set to revolve ; and, looking at me and his relation, he would say, with a countenance such as that with which a schoolboy, apprehensive of undeserved punishment, regards his master, *Indeed, I cannot help it !* But his most constant movement was that of his arms ; and it was very curious, exactly imitating the gestures of a person driving a phæton ; to which the patient had been long accustomed every morning, but had discontinued it for a few days. These gestures continued frequent till Monday. He declared that he could not restrain them ; and at breakfast on Monday, when he was quite sedate, seemed rather amused with his own inability in this respect. For the first 24 hours he had only five or six slighter fits ; but then he had no rest till Saturday night ; when he fell into a profound sleep, and had the usual number of fits of both kinds, with a paroxysm of phrenzy early on Sunday morning. On Monday, before day-break, he had a similar, but fainter paroxysm, which was the last. During the rest of Sunday night he slept very profoundly, as he had also done in the day-time. At this period the muscular agitations were principally confined to the fingers,

He was left stiff and sore, as from severe exercise : the pulse soon became weak. From Friday to Sunday-night he was full of fear, except when torpid : and what is remarkable, not only was the prevailing state of mind the same as during the action of the opium, but he was

haunted by the very same apprehension of having been poisoned. The whole effect of the opium, I was told, lasted on its first exhibition, about 40 hours; that of the oxygene, which was far less violent, continued 12 hours longer; and the extraordinary play of the muscles was peculiar to the latter occasion. Indeed during sleep it continued just perceptible for some time afterwards, as the same relation, who watched the patient a whole night, discovered; and he had reason to believe, that the same apprehensions which he expressed during his excitement, infested his dreams. These efforts, which never produced any disturbance, subsided; and the patient became just what he was before respiring oxygene.



Extract of a Letter on EPILEPSY.

July 10, 1796.

Bennet-street, St. James's.

DEAR SIR,

IT is the duty of Physicians, who wish the improvement of medicine, as well to relate their want of success, as those cases in which their remedies have succeeded, in order that experience may disclose what we should pursue, and what avoid.

C A S E III.

Miss N—— was subject to epileptic fits. She had been under the care of Dr. Turton, and other eminent physicians; and, when her case was referred to me, she had

had no appetite, frequent borborygmi, paleness, and coldness of the inferior extremities, with often considerable heat of the superior and frequent flushings. What astonished many was, that she possessed the complexion of a person in health. The vital air, in a moderate dose, was tried; and, though this young lady had not had an epileptic fit (she was, however, subject to faintings three or four times in a day) for some months, she was immediately after the inhalation seized with an attack. For some minutes this amiable lady remained torpid; then she violently struggled with convulsive motions of the legs, and sometimes of the arms, overcoming the strength of her attendants. She at last grew delirious; pointed to a particular spot in the room; roamed in her imagination; her eyes wide glaring, and fixed: she then attempted to bite her attendants; and, after passing three hours in this dreadful state, the hysteric ball having gradually subsided, she fetched a deep sigh, and recovered, perfectly unconscious of what had passed. But she now was unable to walk, felt a violent head-ach, and went to bed. The next day, as was usual, she had lost her voice. In consequence of this attack, the vital air was desisted from for a week; during which time she had no return of the hysteric epilepsy: but, not conceiving at that time, that such an effect could arise from one application only of the superoxygenated air, reckoning it as an accidental occurrence, I urged another trial; but the effect was exactly the same. I then ordered an emetic; and was surprised to observe the quantity of *ropy slime* that was cast from the stomach. That night was passed free from a hecking cough: the next day she was not troubled with headach, was chearful, and the lower extremities were less cold.

C A S E IV.

In another case of epilepsy, Miss L—— inhaled the vital air, and felt an immediate determination to the head; which fulness continued throughout the day, threatening a return of her usual complaint. Reasoning now on this case, I conjectured that, as the *aorta descendens* passes between the slips of the diaphragm, and this muscle partakes of the same nerve as the stomach, it seemed probable, that when this viscus was loaded with mucus, a spasm or spasms of the diaphragm might succeed, compressing betwixt its two crura the aorta: hence the difference of the appearance and feeling of the upper from the lower parts of the body. The loss of voice, the globus hystericus, and the rabies, which frequently attend these fits, seem also to prove the same sympathy; as the recurrent nerve, which supplies the throat, is a branch also of the *par vagum*.

C A S E V.

After these unsuccessful trials, Mrs. Paynter, who lives at No. 2, Brompton-terrace, came to consult me. She had been subject to hysterics, faintings, and epileptic fits, for more than seven years. She had no appetite, weak digestion, excessive debility, coldness of the lower extremities, flatulence, emaciation, disturbed dreams, palpitations of the heart, and great lowness of spirits. Having premised an emetic and cathartic, and cleared away the superabundant mucus of the primæ viæ, I then gave the vital air; and the accelerated blood meeting with

with no obstruction in the aorta, now diffused heat through the whole system. To prevent the glands, or exhalant arteries, of these parts, from throwing out too much mucus, I next gave tonics, as bark, myrrh, and steel ; and, by using occasional evacuations, continuing the daily inhalation of the vital air, after ten days the fits no longer made their appearance, and her appetite, complexion, and sleep returned ; and at the end of six weeks her constitution was so firmly established, as to need no more medicine or air.

I am, &c.

R. J. THORNTON.

To Dr. Beddoes.

C A S E

CASE VI.

MELANCHOLIA.

ST 3210

ALGONQUIN

*Letter from Dr. CRAWFORD.**July 13, 1796.**Castle-street, Holborn.*

SIR,

MY greatly respected friend, Dr. Thornton, at my solicitation, undertook to afford his assistance to Mr. W——. The case of that unhappy young man, as related in a letter addressed to you, which the Doctor has shewn me, is perfectly correct. The first time he inhaled the vital air, the effect was truly surprising. He threw himself into a number of grotesque attitudes, remaining stiff in each he assumed, similar to what appears in catalepsy; nor changing them, unless urged to motion. A dawn of reason soon after disclosed itself by several acts which were consistent, and plainly evinced rational design. The instances noticed by Dr. Thornton form only a very small part of the different occupations in which he engaged; and from which the most sanguine hopes were formed of his being shortly restored to the full use of his intellects. It was with real grief his family, and all who were concerned in the management of him, observed, that as he advanced in the recovery of sense, he increased in obstinacy: and in a very short time, no plan that could be devised was capable of prevailing upon, or obliging, him to continue the inhalation of the vital air. Here his friends sincerely joined me in lamenting, that pneumatic medicine was not yet sufficiently advanced, to render the exhibition of it to such a patient practicable. Were rooms provided, according to the plan you have proposed, patients of Mr. W——'s description placed in them, by having alone superoxygenated air to inspire,

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might

might be assured of deriving from it all the benefit it is capable of producing. From the good effects which attended the small portion he made use of, there is every reason to believe, that if it could have been administered in adequate quantity, the tear of sorrow would have been long since wiped from the cheek of an unhappy wife, a protector would have been restored to infant children, who necessarily want his parental guidance; and cheerfulness would have been resumed in a family, which has been too long suffering the most oppressive grief.

I am,

Sir, &c.

JOHN CRAWFORD:

To Dr. Beddoes.



Extract of a Letter from Dr. THORNTON, on Melancholia.

July 12, 1796.

Bennet-street, St. James's.

Mr. W——, married, aged 28, having two children, the son of a gentleman of extraordinary powers of mind, and himself once the pride of his acquaintance, for the last two years has exhibited the most melancholy picture of human nature. He neither, during this long period, opened his eyes or spoke: he would remain, for hours, in one posture, with his head towards the ground, collecting the saliva, which gushed from his mouth; and, unconscious of all the decencies of life, he was commonly as loathsome as he was pitiable. His hands, feet, and face, were icy cold: his bones were absolutely through
his

his skin ; which of course was broken into numerous sores. As he had no voluntary movement, to prevent him from starving, food was put into his mouth ; which was then closed, with his nostrils, with the hand ; and, in the struggle of suffocation, some might be got down, but wholly unmaſticated. Under ſuch forlorn circumſtances, in the preſence of his phyſician, Dr. Crawford, I adminiſtered the vital air ; and, to the great ſurpriſe of all preſent, after the inhalation, for more than a quarter of an hour, he reeled about the room, like one intoxicated with wine, and ſometimes ſtiſſened like a ſtatue ; and, when this ſtrange paroxyſm was over, he knelt down, and took Dr. Crawford by the hand, which he kiſſed, ſhewing ſigns of thankfulneſs and gratitude : and, though for the laſt two years he had been dreſſed like a child, the next morning he was obſerved to dreſs himſelf completely. I gave Mr. W—— the vital air the next day following ; when he had many contortions of his face, his mouth being ſeveral times drawn awry. I then, in concert with Dr. Crawford, ordered an emetic and cathartic ; and, after this evacuation, the vital air only diſſuſed a glow over his whole body. The journal which I keep of my patients, diſcloſes the progreſs of the caſe ; and I ſhall ſelect the alterations as they were produced. Firſt, through the operation of emetics, at the interval of ſix or ſeven days, and aloetic pills in the evening, and a tonic in the day of bark, myrrh, and ſteel, with the inhalation of vital air, warmth of the whole body was conſtantly kept up ; he ſwallowed his ſaliva ; then he took to chew his viſtuals ; digeſtion now going on, with keen appetite, he grew fat, and the ulcers healed, and his cadaverous countenance was changed into the appearance of health : his reaſon alſo gradually returned, as was manifeſt by many little incidents. One day, being
ordered

ordered to bathe his feet in warm water, as his attendant was out, he chose to carry up the pail for the maid. The next day, my servant having brought up the coal-scoop, and laying it down in a hurry, he took it up, orderly raked the fire, and put on the coals. I shall relate but one other incident. His father having returned home fatigued, it being dusk, and asking for a glass of wine, he took up the bottle, and held it to the light; and, perceiving it was Port wine, which his father seldom drinks, he laid it down, and then taking up the white wine, he poured him out a glass. He soon observed all the deficiencies of life; he sat up at table with the family; would occasionally converse; and not unfrequently open his eyes. As he grew more rational, his disposition manifested the most stubborn obstinacy, and his art was such, as finally to elude every method which was tried to make him inhale the vital air. It was in consequence desisted from, and I continued the other medicines, with the addition of the electric bath; which resembles a garden-box in shape, with a seat, the inside being coated with about sixty square feet of tin foil; which was insulated, and connected with an electrical machine of great magnitude, and of a new construction. This seemed to be of use; at least the benefits above related continued in a great degree; and even the servant, as well as myself, knew exactly when the emetic was wanted, by the loss of animal heat, and melancholia, which was as constantly removed, when the superabundant mucus was discharged from the stomach.

OBSERVATIONS

OBSERVATIONS
ON
THE PRECEDING CASES,
BY
THE EDITOR.

OBSERVATIONS.

ALL medical knowledge is undoubtedly founded upon the observation and comparison of cases. Nevertheless, reports of the most unimpeachable fidelity sometimes tend very little to advance the art, and not at all the science, of medicine. Let me suppose that a physician undertakes to institute an impartial comparison between the efficacy of errhines, of warmth externally, of æther, of arsenic, valerian, emetics, and other articles of the *Materia Medica*, in head-ache ; and that he gives in numbers the result of an extensive experience. If the public were not beforehand in possession of a sufficient number of gross observations, which may be multiplied at very small expence of thought, the labours of our practitioner will shew that by trying these remedies one after another, we may hope sometimes to effect a cure. His figures also may afford some help in judging with which remedy to begin. This information has its value, and deserves to be thankfully accepted, till better can be had. But it belongs to science to sort facts, to detect their resemblance and discrepancy, to teach why one remedy succeeds better than another in two complaints of the same denomination, and why, in some instances, all fail. A few observations, arranged according to their natural affinities, are more valuable than an infinity of undistinguished facts ; though collections of mere un-analyzed facts, are often presented with the utmost good faith, and not seldom accepted with the utmost good nature, as the only guides to solid practice in medicine. Such authors and such readers, little sensible per-

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perhaps of the advantage of discovering principles, are heard perpetually to decry speculation. But their disapprobation has small effect in retarding science.—The utility of just theory encourages successive attempts, and the difficulty of ascertaining causes is an excuse for failure.

These reflections will I hope justify me in endeavouring to explain the chief circumstances in the foregoing remarkable cases. However they may differ in some respects, they seem to me to present certain phenomena capable of illustrating one another.

In the first paralytic patient, oxygene appears to have restored irritability to the red muscles of locomotion. But the absorbents, which may be supposed also to be muscular, though of a somewhat different construction, did not equally, or did not at all, recover their power. In R. G.'s case of anasarca of the lungs, which I have related at p. 164, of *Considerations*, part 1. edit. 3d. I was disappointed in the effects of oxygene gas. Dr. Darwin, *Considerations*, part 3. experienced the same compleat failure. In Sir W. Chambers it seemed in some way to suspend the dropical symptoms, and in Mr. Barbor it had pretty manifestly the effect of rendering the absorbents susceptible of a stimulus, which did not act upon them before. In the present case we have a clear distinction of great curiosity, and of great practical importance too. From its immediate and permanent effects, *oxygene must have specifically acted upon the arteries, and probably upon the locomotive muscles*; and what is extraordinary, while these parts were recovering their healthy functions, the absorbents of the extremities were becoming weaker. This direct specific power of oxygene

gene is confirmed by the cases of Danby and Trayhern. The origin of the defect of voluntary power over the muscles, in these three cases, requires attention. In the present case, was it from contagion or cold? Trayhern's palsy was, I think, evidently the sequel of rheumatism. In Danby it was the effect of lead.

In these well-attested instances, the efficacy of the gas seems palpable, and they bear to one another the testimony of analogy. For although Trayhern at first took some of the medicines entitled *tonic*, experience does not warrant us in ascribing the restoration of his muscular power to their agency. The recovery of sensibility, mentioned in Mr. Kentish's instructive report, I consider as a secondary effect of some species; perhaps arising from the excitation of the brain by the more stimulating blood.

The motions, caused by oxygene in the cases of epilepsy and melancholia, are scarce less remote from the course of ordinary appearances than those occasioned by the application of metals to denuded nerves. Galvani himself could hardly have been more astonished than myself and the other spectators of my epileptic patient, as must be sensible to any one who shall be at pains to follow my account in imagination. The phenomena, however, I imagine to be perfectly capable of a satisfactory elucidation, which I shall now attempt.

Pathology is on no account more indebted to the author of *Zoonomia*, than for the light which he has thrown upon the obscure origin of convulsive diseases. I do not indeed believe that every twitching of a single muscle, or of a single bundle of fibres, is an effort to

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relieve pain. These less considerable diseased actions I impute to irritation; and it is to me probable that the limbs are occasionally stimulated into convulsive startings. If the nerves be conductors of the power of the brain, or, it (as some of Dr. Valli's experiments lead to conjecture) they themselves are in any degree a source of the *vis vitæ*, they must, it should seem, like other constituent parts of the system, be liable to a diseased condition. And a greater derivation of nervous power to any muscle or part of a muscle, would increase its excitability so as to occasion it to contract from its ordinary state of mere extension without any other stimulation: and is it impossible that electricity spontaneously generated in parts, should excite partial contractions by irritation? The late experiments on animal electricity have shewn that the nerves with their muscles are the most delicate of all electrometers. If these remarks be just, it will follow, although the deficiency is indeed unimportant, that in Class I. of Zoonomia, Part II. there is wanting a genus for irritative convulsions. But with regard to spasmodic and convulsive motions, constituting dangerous and obstinate diseases, I am obliged, after much doubt and inquiry, to acknowledge that they are justly ascribed to painful or uneasy sensation, producing morbid voluntary action.

By an undoubted law of the animal œconomy muscular exertion is employed without deliberation, for the relief of pain. Wherever I have been able to trace epilepsy to its first fit, I have found it distinctly preceded by distressing or disagreeable feelings; and though they may be very obscure in certain examples, they figure, in elementary authors, among the chief occasional causes of epilepsy. In Case II. the frightful dream, excited by
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the tremendous scenery beheld the preceding day, and followed by the first fit, furnishes a combination of events, that cannot escape the most careless reader. And the relief so constantly said to be afforded by the slighter fits, deserves to be pointed out as a curious confirmation of this doctrine, for those fits being short and not attended with any considerable convulsions, they must be regarded as relieving disagreeable sensation, without much exhausting the living power of the system, which is seen to suffer so excessively when the voluntary muscles are agitated by long or violent contractions. These slighter fits, I was told, were often attended by some discharge of air; a particular that deserves notice, since the fits might have sometimes arisen from a torpor of the stomach or bowels, during which the air was generated and lodged in the intestines.

The very slight incidents and exertions, which after the aggravation of the disorder by cold bathing, brought on the paroxysms, mark the case as peculiar in the degree of susceptibility. I have never myself seen a patient equally susceptible, except a young person, who having become cataleptic (probably from being the subject of a trick at school), had for some time a paroxysm, whenever the feet were moved from the bed or sofa, so as to be dependent. These examples of fits from slight subsequent occasions, are apparently analogous to the intoxication and purging, which are said to be producible by trifling quantities of alcohol and opium, or aloes, in persons who have begun with enough of these articles to ensure the effect, and afterwards gradually lessened the dose.

At those times, when the disagreeable ideas associated with the sight of a precipice, or the disagreeable sensations occasioned by the exertion of reading, were followed by an accession of epilepsy, the system being in its ordinary state, the spasms and convulsions were of the usual kind. The motions, occasioned by the exhibition of oxygene, betray a specific power in the cause. They were not the effect of apprehension from respiring the air, otherwise they would, it should seem, have taken place in much less time than a week ; and they would doubtless have been of one or other of the two species, which differed so remarkably in severity by reason of the accumulation of excitability during sleep. It remains, therefore, that all the muscles, rendered unusually susceptible of motion, were ready to fall into convulsions, in consequence of the smallest ungrateful sensation.

When debilitating powers aggravate epilepsy, they do it by increasing the sensibility of the system. Thus the present patient was permanently worse after cold bathing, as also for a short time, while the secondary effect of opium lasted. That the oxygene caused general excitement, appeared both by the state of the pulse, which was nearly such as is observed in inflammatory diseases, and from the phrenzy fits.

If in cases III. and IV. an unpleasant sensation was experienced, that would be followed by aversion and by a fit, without any particular power possessed by oxygene. A sense of fulness in the head is consequent upon greater efforts of respiration than common ; and, provided it could have been done consistently with prudence and humanity, it would have been desirable to try, whether the same effect would have followed the respiration of
atmospheric

atmospheric air in the same manner, the patient not knowing what air he was breathing in the comparative experiment. A cautious reasoner, without pronouncing it impossible, will hesitate before he ascribes a fit of epilepsy to the immediate peculiar agency of oxygene in small quantity, and, as I suppose, very largely diluted.

Although I have been more circumstantial in developing these phænomena than the sagacious physiologist may deem necessary, I shall still bestow a few reflections upon the case of Melancholia. The spasms and convulsions, succeeding the exhibition of oxygene air, afford a curious example of the affinity between insanity and convulsion (*Zoonomia* II. p. 354, *and elsewhere*); as also does Case II. in which opium or oxygene produced transient insanity. In the present instance, we may conclude, that no such reciprocation had taken place before; otherwise the patient's friends would not have failed to inform the physicians. From the succession of events, therefore, and the analogy of the preceding cases, the new and singular motions must have been owing to a new condition, directly or indirectly superinduced by the respired oxygene. Whether this consist in increased irritability from addition of oxygene to the muscular fibres, or in some effect of altered blood in the arteries that traverse the body of the muscle, is a question not yet decided, nor perhaps easy to decide. It seems certain, that the power which had been expended on painful trains of ideas, was now derived to the muscles; which may be said to have invited it, by being rendered more contractile; and that thus the melancholy trains of ideas, which even parental affection had not power to prevent, were interrupted. At the same time, the action of the arterial system undergoing some change, or I suppose becoming

becoming stronger, a degree of agreeable sensation was introduced, and certain surrounding objects were noticed with pleasure, as happens in incipient intoxication.

The practical inferences to be deduced from this melancholic case, and the three first epileptic cases, are, in my opinion, directly opposite. Where formidable convulsions already exist, it seems obvious that no cause should be applied which renders the muscles more ready to be thrown into morbid action. But the propriety of making certain epileptic patients sleep in an atmosphere with less oxygen, which had already been proposed upon analogical grounds, is very strongly confirmed by these several concurring facts. The patients, who would reap most advantage from this expedient, I apprehend would be those whose accessions are most frequent or severe in their sleep; and if they were young persons of *sanguine* temperaments and *plethoric* habits, as they have been termed, they would stand a still greater chance of being benefited by a reduced atmosphere.

In bad cases of melancholy madness, the risk of exciting some degree of convulsion may reasonably be run; and it may be proper to support and vary by opium, administered during the intervals, and also by the warm bath, the pleasureable sensations occasioned by oxygen.

The viscid mucus, so commonly noticed in cases of insanity, I suppose to be in itself inoffensive; and occasional emetics seem useful, not by eliminating this matter, but by changing that condition of the stomach, by which it is produced, and which is accompanied with great torpor of
most

most other parts of the system, except perhaps those employed about the distressing ideas.

To these reasonings I shall subjoin a short account of two illustrative cases. I owe the first to a physician in my neighbourhood; and think, that as cause and effect seemed palpable even to the patient, it may be useful by reminding those whom it may concern, of the propriety of making the necessary inquiries in similar circumstances.

“ In the latter end of the year 1794, I attended a
 “ young person who was ill of an asthma. She was un-
 “ expectedly attacked with epilepsy. The fits returned
 “ frequently in the day, and almost every day for several
 “ months. For a length of time, notwithstanding
 “ the strictest enquiry, no cause, apparently sufficient to
 “ produce these effects, could be discovered. At last,
 “ excruciating pains in making water overcame the par-
 “ ticular false delicacy, and obliged her to disclose their
 “ source, which was an acrid discharge, excoriating the
 “ vagina, proceeding from a diseased uterus.”

This is a good example of the origin of epilepsy. I have elsewhere mentioned, in general terms, that I had observed stricture induced, and rendered tighter in asthma, by the respiration of diluted oxygene gas. This has occurred in two cases. One was in a gentleman who for many years had not passed 24 hours without a fit, and whose heart had become dilated before I saw him. His was among the very first cases in which I ever directed the exhibition of airs. The dilapidated state of his health rendered me excessively suspicious. It was evident on several trials, that oxygene, which I
 had

had taken care to dilute largely, brought on difficult breathing and stricture immediately. The patient desired me to proceed till I had satisfied myself. I was convinced, that no increased effort of inspiration, or other mechanical circumstance, produced the bad effect, because it did not take place with hydrogen gas diluted. I lost sight of the patient before I could give this method a proper trial.

The other was the case of a person, above twenty, weak from rapid growth, and who had been long subject to nervous head-ache and daily fits of extremely difficult breathing, with stricture, which did not terminate in expectoration. There were circumstances in which the case was different from common spasmodic asthma. The patient was constantly obliged to sit quite erect; if, in sleep, this posture was changed, awaking in distress was the consequence. The most strict enquiry did not give reason to suppose water in the chest. After a three-week's course of oxygene, in the proportion of one, two, three, and once five quarts, to 30 of atmospheric, the patient and the physician became reluctantly convinced, that some increase of the tightness of the chest was produced by it.

It appears, therefore, that when a habit of spasmodic and convulsive actions has taken place, they will in some cases be renewed and aggravated, in consequence of some change this substance produces in the muscles. The same thing appears in Case II. with respect to deliberate voluntary motions. Long habit had given the muscles, employed in driving an open carriage, a tendency to act together and in succession; and this, added to the propensity, acquired from the gas, produced the
gestures

gestures that occupied so much of the time between Friday and Monday morning.

There are, however, circumstances in which the cure of spasms and convulsions is the consequence of respiring oxygené; as is evident from the cases where asthma has been mitigated, or has disappeared, under the daily use of oxygené for months; and from a very remarkable case of spasmodic seizures, apparently affecting the diaphragm, in which opium, largely administered, having lost its effect, oxygené was given with complete and permanent success. The first part of this history is given in the *Collection of Letters*, p. 36. Of the result I have been informed by letter from the patient's friends, who are persons of much eminence in the medical world.

What these circumstances are, I have not been able precisely to determine. But, if ever an exact catalogue of them all be made out, they will, I believe, be found referable to one or other of the two following laws.

I. OXYGENE SOMETIMES, BY RESTORING THE ACTIVITY OF A LANGUID PART, REMOVES THE SENSATION THAT OCCASIONS THE CONVULSIVE EFFORTS, AND SOMETIMES—(see this exemplified on a principle somewhat different, in the case of head-ache, related by Dr. Darwin, in *Considerations*, Part III.)—BY DIMINISHING SENSIBILITY, OR GIVING GENERAL ENERGY TO THE SYSTEM, DESTROYS HABITS OF MORBID ACTION.

2. WHEN IT PRODUCES NEITHER OF THESE EFFECTS, IT AGGRAVATES SPASMODIC AND CONVULSIVE COMPLAINTS.

AMONG the authors who flourished in the period between the appearance of the Chemists or Anti-Galenists, and that of the more modern systematic writers of the Continent, there are some that may seem to have entertained ideas on the origin of convulsion, similar to those of Dr. Darwin.

Their expressions were probably suggested by Van Helmont's reveries concerning his Archeus. The Stahlians will be thought to approach still nearer to the same theory. The two following passages from Sauvages (Clas. iv. Ord. iv. 19) will illustrate these remarks.

Motus muscularis, ait Sennertus, nunquam fit citra appetitum aut rationalem, aut sensitivum; cum itaque voluntas seu appetitus rationalis non jubeat motum, illum a cupiditate seu appetitu sensitivo JUBERI manifestum est.

Again. *Quae in corpore vivente fiunt operationes ab anima ejusque facultatibus proveniunt, unde hos etiam inordinatos motus naturam solam excitare extra dubitationis aleam est (Schneider. de Epilepsia)....Causa (epilepsiae). Acerrimum facultatis naturalis expultricis, contra molestias irritantes, in universo musculorum genere excitatum certamen. (Idem.)*

Notwithstanding

Notwithstanding such a degree of resemblance in expression, it is probable that a diligent scrutiny would evince a wide difference between preceding authors and our contemporary, with regard to the principle itself, the phaenomena connected by it, and its practical application. An enquiry into the difference or coincidence might be curious. But, instead of entering into it, I shall lay before the reader a piece of information, which will prove satisfactory to him, very nearly in proportion to his benevolence, and to the interest he may take in the advancement of useful knowledge.

Letter from Mr. KENTISH.

Newcastle, Aug. 12, 1796.

SIR,

I SHOULD have acknowledged the receipt of your obliging letter some time ago; had I not waited to send you the sequel of the case; which, from my former account, would appear unfinished, and might not receive the credit it merits from uncandid readers, or those prejudiced against the pneumatic practice. I saw Captain Helmsley a few days ago, which is the first time since I sent you the report. He has not taken any medicine since he left us, and has regularly pursued the riding and walking exercise recommended. His recovery has been progressive; and I have at present the inexpressible pleasure of assuring you, that I saw him walk without the aid of either stick, crutch, or any assistance whatever. In short, when I reflect upon the helpless, nay, hopeless situation he was in when he came to Newcastle, with every probable appearance of his remaining so during the remainder of his existence (for he had gone through several ordeals of medicine) I find terms inadequate to express my thanks to those who have placed such means in my power. On further investigation, I find, by some of his acquaintance, that the eruption of his face is attributed to the too free use of liquors. Should we, on further trial, find that oxygene gas is of use to restore power to a system, which has been excited to too great action

by

by free living ; which consists in general of substances highly hydrogenated, it will be invaluable ; for we find most of the diseases of the present day to be of this class — for few are the orders of Society who do not live above par. In a case of dropsy I have given oxygene gas ; at first the effects were very salutary, increasing the secretions by the skin and kidneys ; but, from the impatience of the young gentleman, who wished to be well at once, he increased the dose, so much that he excited a short dry cough, which obliged him to abstain from its use : thus depriving himself of the benefit that was likely to have arisen from its use, and drawing an unfavourable conclusion, from his being obliged, through prudence, to give it over. I thank you for the hint respecting the purity of the oxygene air. I have tried what I have made with nitrous gas, and find it equal to that obtained from the red oxyd of mercury ; and, by putting quick lime into the refrigeratory, and using the agitator, I keep it very free from carbonic acid gas. I sometimes use Monsieur Seguin's method, of trying its purity by inflaming phosphorus in the gas over mercury. It is mentioned in the *Annales de Chymie*. In one case in the Hospital here, oxygene gas has been of use internally, given for the cure of an ill-conditioned ulcer. A fermenting cataplasm was used at the same time. I have no doubt, when impartially viewed, that great benefit must accrue from its use in Hospitals, as the atmosphere in them is generally below par in respect to oxygene gas.

I have had an opportunity of paying considerable attention to a species of accident very common among colliers in this part of the country : viz. burns from the explosion of hydrogen gas in the mines. The
little

little information to be got from authors, and the contradictory applications they recommend, has made me think and act for myself in the treatment of them; in which, at present, I hope I have established one or two principles, which may be of use to be known. I purpose giving a comparative view of different modes, illustrated by cases under my own inspection: as I am induced to think it is the want of this comparison that makes the treatment so indecisive.

I am, dear Sir,

With the greatest respect,

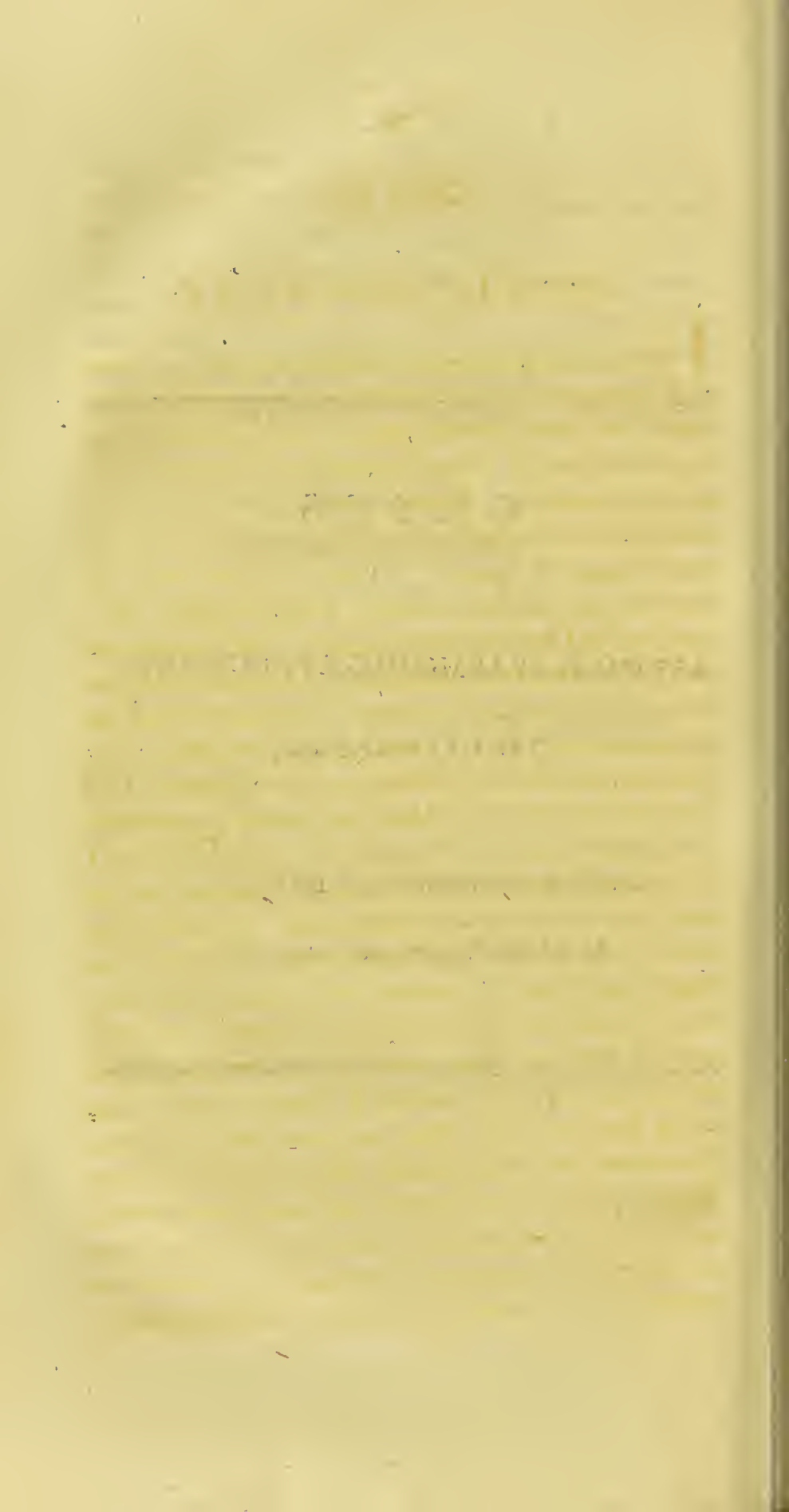
Your's sincerely,

E. KENTISH.

To Dr. Beddoes.

CASES

CASES
OF
ASTHMA, SPASMODIC AFFECTIONS,
CHLOROSIS,
AND
OTHER DISEASES OF DEBILITY,
In which Oxygene Air was used.



CASE VII.

Note from JAMES HARE, Esq. M. P.

I WILLINGLY consent to publish my case, in hopes that other persons may obtain relief from similar treatment. For near eleven years I have been subject to frequent attacks of nervous asthma, under which I suffered inexpressibly. Blisters on the chest, with expectorant medicines, usually relieved me, though not till after many hours of agony. I was troubled with this disorder more in damp than in frosty weather. If I caught cold, I scarcely ever escaped it. My strength and spirits were very much affected for a long time after the difficulty of breathing had left me. About the middle of September last (1795) I began to take oxygene air, by the advice and under the direction of Dr. Beddoes. In a few weeks there was a sensible and visible improvement in my general health. Towards the end of October I caught cold, and had a pretty severe fit of asthma, though much less so than many former ones. From that time to the present I have only had five attacks, all slight in degree and short in duration. For many years past I have suffered much from illness in the spring; but this spring I have not been confined for one hour; and, during the whole ten months I have enjoyed a much better state of health than for many preceding years. Hot rooms and damp weather affect me much less than formerly; and I have caught cold several times without its bringing on an asthmatic fit. Having taken the oxygene air once a day (with few interruptions) for about nine months, the beginning of this month I discontinued it;

in hopes that I may go through the summer without its aid, and so reserve it for future exigencies.

Conduit-street,

July 29, 1796.

J. HARE

A Letter from Mr. PHIPPS, Surgeon and Oculist in Ordinary to his Majesty—on Asthma. Cases VIII. IX.

Pall-Mall, August 8, 1796.

SIR,

Mr. Stepney having mentioned to me that a servant who attended him had been afflicted with a spasmodic asthma above thirty years, I recommended him to place him under the care of some person in the habit of administering factitious airs. Accordingly he did so. He was ordered a more generous mode of living; and whenever his disease has threatened an approach, it has been invariably put off by inhalation of vital air. During the last eight months, he has had but two paroxysms, which were so slight as not to confine him to his bed, as heretofore; and I should add that his son, who, upwards of seven years, had constant dyspnoea, with frequent spasmodic attacks of asthma, was also cured four months ago by the same remedy in seven days, and when I saw him lately he was blooming, and in perfect health.

I remain, Sir, &c.

J. W. PHIPPS.

To Dr. Beddoes:

SPASMODIC

SPASMODIC or ASTHMATIC SEIZURE of the
DIAPHRAGM. Case X.

Letter from the same.

DEAR SIR,

I have just received a letter containing a request of yours, that I would send a particular account of the case of a young lady who had been cured of violent spasms in the side, by means of oxygene air. I heartily wish it were in my power to do it with more minuteness, but I kept no journal of the case. The lady had for nearly three years prior to her inhaling the oxygene, been afflicted with spasms in her side, and indeed, thro' the whole extent of the diaphragm, which appeared to me the immediate seat of the complaint. For the first two years, they were not constant and only slight, very bearable, and easily removed by a few drops of laudanum. During the last year, they encreased (I believe from mental anxiety) to a degree truly terrific. She was now *never* totally free from pain; and generally morning and evening the spasms became so dreadful, that I cannot find words to convey an idea of them. They would continue half an hour, one, two, three, and even six and eight hours. Laudanum to the quantity of three hundred drops produced no other effect, than to render her perfectly delirious. Her breath was also at this time so much affected, that she could not go up or down stairs, without resting every few steps, and panting to a degree that was frightful. In this state during the spasm she first breathed oxygen air, in the proportion of about three pints to twelve or fourteen of atmospheric air, and it almost instantaneously removed the spasm. This same

effect was generally obtained, and there were two and even three days sometimes together during which she had no strong spasm. Nor do I think, after the first week of inhaling the oxygene, they ever returned with the same degree of violence. I found it necessary however to encrease the quantity of oxygene to about six pints to the same proportion of atmospheric air. Thus I gave it constantly at the commencement of the spasm, and always with effect; sometimes complete, and sometimes only so far successful as to render the spasm bearable. After about three months there was a considerable amendment, the spasms were slight and less frequent. She soon after married, and had not the least return for a year and a half; at the end of that period she had some spasmodic feelings, but they were slight, and of short duration: since (that is for above a year) she has been perfectly well. These I believe are the leading features of the case, and I only wish I could have transmitted them to you with greater particularity. I have this morning seen the lad I mentioned in my last, as cured of asthma, he has had no return whatever, and it is now more than three months since he left off the vital air, which he inhaled for six weeks. I have only to add, that

I am, Your's, &c.

J. W. PHIPPS.

N. B. A physician, who had been consulted in this case, in a letter of a date subsequent to that of Mr. Phipps, writes that the lady "now enjoys robust health."

ASTHMA.

ASTHMA. Case XI.

Letter from Mr Baynton, Surgeon, of Bristol.

Mrs. ———, aged 32, corpulent, and of fair complexion, had been in the habit of miscarrying, at about the third or sixth month of pregnancy, for eight or ten years previous to January, 1795, when, after an obstinate cough, which had effected her the greatest part of the preceding Autumn and Winter months, she was attacked on the 16th in the evening by a complaint that very much resembled the paroxysm of spasmodic asthma, except that it was much more violent than first attacks of that disease usually are, and that its remission was attended with a very copious discharge of frothy serum from the bronchial tubes, which was thrown up by a slight, tho' almost continual cough. A large dose of opium was immediately given, a blister applied to the chest, and a mixture composed of oxym scil, gum ammon and pure water, directed to be taken every six hours. The 17th she was much better; the anodyne was repeated at bed-time, and, as the cough was still troublesome, saline draughts, with camphorated tincture of opium, were directed in lieu of the mixture. Her cough soon became better, and the Summer was passed over without much inconvenience, by the assistance of occasional opiates, open air, and cool acidulated draughts of water. On the 27th of September she was again attacked somewhat violently. An opening mixture, a blister, and occasional anodynes, were again had recourse to, with apparent good effect. On the 4th of October another blister was applied to the sternum, the squill pills were prescribed, and

and the opiate repeated. From that time till the 3d of January, 1796, she went on without experiencing any material alteration, but not without the occasional assistance of medicines of the kind above mentioned. On that day she was attacked with hysteria, and was relieved by the bark, after the bowels had been emptied by an opening medicine. On the 23d of April, after experiencing much depression of spirits and coldness of her feet, she became affected with a numbness of the left side; the muscles also on that side of her face were drawn upwards, and she talked so indistinctly that her friends were sometimes at a loss to understand her meaning. Her bowels and pulse were in a natural state, and her mind very much depressed. She had a pain over one of her eyes, and was very drowsy. The bark was again had recourse to, and the foetid gums directed to be taken in the usual dose and manner. From that time until the 23d of the ensuing month (May) she continued to take medicines of a similar kind, with but little good effect. On that morning, about five o'clock, after having had a good night's rest, she was suddenly seized as she had been in January, 1795, with dyspnoea, attended with a convulsive kind of cough, which in less than five minutes from the time of attack increased so as to produce the appearance of suffocation. Her senses forsook her, her face became livid, her extremities cold, and the action of the heart was so much diminished that no pulsation could be felt in the wrist, and but very little in the left side. As much blood as could be taken from the arm was immediately evacuated, it amounted to only about four ounces. A strong solution of white vitriol, in water, was conveyed into the stomach, without producing any effect. Large doses of emetic tartar were
also

also got down every ten minutes, but no effect followed; and she remained in a state of complete asphyxia nearly two hours : during which time a very large quantity of frothy serum, tinged a little with blood, was discharged, without any visible effort, by the mouth and nostrils. About the end of that time some very faint and involuntary efforts to cough came on, which gradually increased, and with every effort large quantities of the frothy serum were thrown off; perhaps the whole quantity might amount to three or four pints. About three hours after the time of attack the difficulty of breathing became very sensibly diminished, and her senses were observed to return. Then the medicines that had been given to occasion vomiting operated in a moderate degree, and occasioned the discharge of the contents of the stomach, which were not remarkable for any peculiarity either in quantity or quality. She recovered so fast as to be nearly in the same state of health that she had been previous to the attack, before the evening of the same day, except that the paralytic symptoms were completely removed, and so unusual a desire for cool fresh air induced that she could scarcely exist if any person by chance placed himself between her and either of the windows, which from that time were obliged to be kept open night and day. At the commencement of this attack, in my absence from home, a physician of eminence was called, who prescribed the remedies that were exhibited during the paroxysm, and in addition directed musk draughts and a blister for the chest. When the paroxysm abated, from that time till the 5th of June her impatience for cool fresh air increased to so alarming a degree, tho' she had been removed into a country situation, that she frequently appeared in danger of suffocation. Her face almost always appeared bloated, and of that blue peculiar appearance

appearance that is characteristic of obstructed circulation in the vessels of the lungs. On that day you were requested to see her, and directed that the opiate should be again had recourse to; that a mustard emetic should be taken; that a teaspoonful of spir. æth. vitriol, should be taken, in a wine glass of water, two or three times a day; that exercise on horse-back should be used twice a day; and that a superoxygenated atmosphere, composed of two parts oxygen and eighteen of atmospheric air, should be inspired morning and evening; and at the same time requested, as the disease was so uncommon, that the opinion of a physician in the North; who has distinguished himself by the ingenuity of his productions, might be taken upon the case. It was accordingly sent him, and from that time to the 18th when his answer was received, the patient continued to pursue the plan that had been suggested by you, with apparent advantage. It was considered by him as spasmodic asthma, and extraction of diseased teeth, oxygen, electricity, and the following medicines were prescribed:—a scruple of the peruvian balsam, at eleven in the forenoon and at four in the evening, in the form of a draught; and half a grain of opium, as a pill, early in the morning and late at night. The opiate in this way failed to afford relief, and occasioned so much drowsiness and distressing constipation, that on the 21st, by your direction, a quarter of a grain of opium only, combined with six grains of rhubarb, was taken every night at bed-time; and a decoction of the yellow bark, with cardamom and orange peel, twice a day. The costiveness was by these means removed, and she for some days thought herself better; but her impatience for cool fresh air by the end of the month had so much increased that it was thought advisable

able to remove her into a situation more open, and at a greater distance in the country. On the 19th of July you substituted the following for what had been last prescribed, with temporary good effect :

R. Cort. Salicis latifol Unc. ii fs.

Aq. ebull—lib ii infund. per horas xii cola.

Colaturæ adde Aluminis dr. iii cap. coch. iii major. ter die.

Her sitting-room, at her new situation, had three large windows and a door, so constructed as to be opposite each other, and nearly in the direction of the points of the compass ; but though the house stood alone on an eminence, and all the windows and the door were kept constantly wide open, night and day, the necessity for fresh air became by the 10th of August so great, that I then saw her much distressed by a person placing himself by accident a few moments only between her and one of the windows. On that day two grains of the Extract of Hemlock, with an equal quantity of Opium, were directed by you to be taken when the impatience for fresh air was most distressing, in an ounce and a half of the Camphorated Mixture, with which a drop of the Oil of Cinnamon had been previously mixed. At this time also six glasses of wine were directed to be taken in the day. She again thought herself much relieved by the alteration of the medicine, and the allowance of wine. But at my visit in the evening on the 13th, I found her on an open down near her lodgings, so distressed for want of purer air, that I was forcibly reminded of the Calcutta scene. Her pulse were oppressed and irregular, her countenance of the cœrulean appearance that had been observed in the most distressing state of her complaints, and I thought

I

I observed

I observed an incoherence in her manner that was unusual; when a friend who was with her whispered to inform me that she was light-headed. I now expected the epileptic return, and lost, in the prospect of present danger, the hopes which had been occasioned by the effects of the tonics and the occasional absence of the paroxysms. I was however agreeably deceived by the gradual recovery that followed in a few hours after, but the event made such an impression on my mind that I thought much of it in the interval that occurred between that time and my visit the next day; and from the effects that had constantly followed the exhibition of tonics, which had been more manifest when the additional quantity of wine was taken, I thought that as the cold-bath had not been tried, and as it had been so strongly recommended by Dr. RYAN in a late work of his, that if you approved it ought to be immediately made use of. Accordingly on that day you were consulted as to its propriety: and, with the precaution of a temperate bath being first tried, you consented to its use: but recommended that the Saline Bath in the road to the Bristol Hotwell should be preferred. On the morning of the 15th she first bathed there; the bath being previously raised by a few pails of boiling water to the temperature of 55. The relief experienced was so great, that she felt and expressed an immediate assurance of her recovery. By my desire the cold-bath was used the 17th and 20th. The same good effects followed. You were then made acquainted with the event, and desired that she might use it every day, since which time she has been, if possible, more sensible of its good effects; and from that time to the present, a period of 7 weeks, has not differed in any respect from a person in the best state of health, except that

that the catameniaë which had not appeared during the last two months, have not been observed to return. I have thus given you the history of this very remarkable case; and if the fact, by publication and your reasoning upon it, can be made in any way useful, I shall consider myself happy in having had it in my power to present you with an accurate and faithful detail.

Dr. Beddoes.

THOMAS BAYNTON.



CASE XI.

Spasmodic Asthma.

THE Editor has before him two letters from FRANCIS GREEN, Esq. of Denmark-Hill, Camberwell, respecting one of his daughters, aged 18, who had been for several years violently afflicted with spasmodic asthma. The letters are dictated by that warmth of kindness, which an affectionate parent feels towards those whom he considers as having been instrumental in rescuing his child from an obstinate and most violent disorder. The following are the facts stated by Mr. Green. The paroxysms, before the patient's arrival at Bristol Hotwells in October, 1795, had "come on periodically once a-week. There " she grew *much worse*, until some short time after I had " the pleasure of meeting with you. I must acknowledge " I think the vital air has been very beneficial to her." This letter is dated September 14, 1796. The essential part of the 2d letter runs as follows:

DEAR

DEAR SIR,

MY dear daughter, as well as my whole family, have every thing to thank you for. The morning we left Clifton, (where Mr. G. had continued a month) turned out very bad. We had wind and rain nearly all the way to Oxford; what increased our fears most was, we lost the air from the air-holder, it being unfolded. We spent the next day there, and although the weather continued very indifferent, to my great surprise my daughter remained well.

The day following we reached home and waited with anxiety for the apparatus, fearful of the return of the complaint, but to our great joy I assure you she has not had a fit since. We have continued the use of the air except at short intervals, and about two months back took her to Brighton by way of trial, but the second day after our arrival, (the weather was very changeable) perceiving a weakness in her eyes, which I have always considered as a symptom of the old complaint, we returned immediately to Camberwell, where after staying a short time, the weather coming on fine, we came again to this place for another trial, and have the satisfaction to say she has continued well without the use of the air.

I am, dear Sir, &c.

FRANCIS GREEN.

Brighton,
September, 1796.

Extract

Extract from a letter from Dr. THORNTON to
Dr. REYNOLDS.

CASE XII.—*Dyspnœa.*

IN the Spring succeeding the severe Winter of 1795, which was characterized by inflammations of the chest, the patient you did me the honor to confide to my care suffered with others. The apothecary, who at that time attended, neither bled or blistered him. As the sequel to this inflammatory attack, he has been subject to dyspnœa, more especially upon using the slightest exercise. Now, my dear Sir, in such unfortunate subjects, where the lungs were inflamed, I have found upon dissection, *obliterated air-cells*, and, where the pleura was the seat of the inflammation, *numerous adhesions*. In either case little can be done or expected from medicine. Nevertheless, as the disease might be palliated, and the constitution strengthened, by the inhalation of an atmosphere of a higher standard, the trial was authorized, and the case is beautiful in itself as throwing considerable light on the subject of respiration. Mr. A. before the inflammatory attack on his lungs was florid, and of a clear complexion: he had once even hæmoptoe; now his cheeks are devoid of colour, and his aspect extremely bilious. Before, heat was insufferable; now he enjoys a fire even in the midst of Summer. Before, his pulse, as he informs me, was accounted full; now it vibrates feebly and quickly. Whilst he inhales a super-oxygenated atmosphere, he always feels his respiration easy; his parched hands become sensibly moist; he has a glow and tingling sensation in his fingers; and as Dr. Haighton, the lecturer on Physiology at Guy's-Hospital, noticed, his pulse is rendered both slower and considerably stronger.

stronger. Immediately after this easy process, he has obligingly gone down stairs, and upon coming up again, he has breathed perfectly free, as many spectators have witnessed. In this case might not a constant inhalation of an atmosphere of a higher standard produce the most certain and essential service: but this, my dear Sir, is reserved for a more advanced state of the Pneumatic practice, when rooms shall be fitted up for that purpose.

I have the honor to be, &c. &c.

R. J. THORNTON.

Observations on this Case.

1. This inflammation of the lungs was occasioned by looking over furniture, which was kept in a damp room. To remove the chill this produced, (which is generally the forerunner of fever) recourse was had to brandy and water, and Mr. A. took white wine whey at night, the pernicious consequences of which practice Dr. Beddoes justly deplores. Vide *Observations on Fever, Catarrh, &c.* Printed for Murray.

2. Do not nine dyspnœas out of ten proceed from previous inflammation of the organ of respiration?

3. Can adhesions, when they take place, be elongated by the administration of emetics?

4. Can obstructed air-cells be renewed by a frequent and forcible expansion of the lungs?

5. When

5. When coagulable lymph is deposited, can this be absorbed by passing into the lungs substances suspended by the active powers of certain airs? R. J. T.



CASE XIII.—*Dyspnœa.*

July 2, 1796. *Bennet-street, St. James's.*

DEAR SIR,

THE subject of this report is a very corpulent gentleman, who had been afflicted more or less with dyspnœa for twenty years, and under different physicians with little or no alleviation of his complaint. Mr. Colvin had commonly but small appetite; was troubled with dyspepsia; and of a costive habit of body. Upon coming up stairs he was accustomed, as he gave at first evident demonstration, greatly to puff and blow; having, as he expressed himself, *no wind*. He was troubled with lowness of spirits; his body was distended; and his nights were so disturbed, that he seldom slept three hours together. After he had been under my care but a fortnight, he came with his partner, Mr. Lowndes, a wine-merchant at Temple-Bar, who assured me, that he thought Mr. Colvin was better than he had seen him these last eighteen years. Having inhaled six quarts of vital air mixed with thirty of atmospheric, this gentleman felt, as usual, the easiest respiration; a genial glow with perspiration; vigour, and *lightsomeness*; or in a word, for these are his own expressions, *the sensation of indescribable health*. Upon asking him, whether he perceived he was
 stronger?

stronger ? in an energetic tone of voice, he declared, *he felt five times as strong* ; he added also, that his appetite was returned ; and his sleep was undisturbed and continued throughout the night. He then went down stairs in the presence of Mr. Lowndes and Mr. Curtis, the son of an eminent surgeon at Chiswick, and having come quickly up stairs, he was able freely to discourse with us *immediately*, which Mr. Lowndes declared, he had not done for years, nor was this a transitory effect, for the same was observed by all his friends both at home and abroad.

Observations on this Case,

1. Did not the corpulency of this gentleman denote a deficiency of oxygen in the system ? Let the reader here consult your observations on Obesity ; printed for Murray.

2. Did not his dyspnœa depend wholly, as in chlorosis, scurvy, putrid fever, &c. upon a want of a due quantity of oxygen, or vital air, in the blood ?

3. Did not his defective appetite, impaired digestion, flatulence, coldness of the extremities, and torpor of the alimentary canal, proceed also from a want of a due quantity of the same principle ; for in proportion as his system was more oxygenated, all these distressing symptoms disappeared ?

4. I should perhaps here observe, that as I supplied the lungs with air, I was mindful to obviate costiveness, and gave the same topics, which before had been often and ineffectually applied, : Are we not therefore in this case to attribute the cure almost wholly to the exhibition of the super-oxygenated air ?

R. J. T.

*Extreme Weakness, or what would not be improperly
called a Decay of Nature.*

CASE XIV.

July 4. 1796. Bennet-street, St. James's.

Mrs. ROBERTS, aged —, who lives at No. 43, Piccadilly, was more than twelve years ill. She had been successively under the most eminent Physicians, first under Dr. Pinkston, then under Dr. Cadogan, next a full year under the celebrated Dr. Cheston of Gloucester, from him she passed under the hands of Dr. Farmer, of that city, who attended for two years, and she was next under a distinguished practitioner of Bath, and so she went from one able practitioner to another; she was at last so reduced, that she was not only confined to her room, but could scarce get from her bed to an easy chair, which was placed in it. Dr. Merryman now attended her. Her appetite was gone; her spirits sunk; her countenance hippocratic; and her nights were not unfrequently without sleep. Being called in, I premised a mild aperient, and afterwards ordered bark and lime-water, and gave Mrs. Roberts the vital air. At the time of inhalation this lady felt greatly relieved; the yellowness of her complexion soon wore off; she had a glow of warmth; her appetite and perspiration were established; and so sudden was the amendment, that in less than a month she was restored to perfect health, and has continued so (except a slight discolouration [blackness] of the leg, which was removed by the vital air in a few days) now for above four months.

I am, dear Sir, &c.

Dr. Beddoes.

R. J. THORNTON.

P. S. The quantity of vital air given was six quarts to thirty of atmospheric.

CASE XV.

Communicated by Dr. Lawrence, of Swafham, Norfolk.

December 30, 1795.

MISS L. G. 19 years of age, had a suppression of the Menfes for more than two years. Her countenance was pale in the extreme, lips white, appetite impaired, general sensation of coldness, and aversion to exercise. Chalybeates, with other deobstruent and aperient medicines, were directed for her;—as these had been continued for three weeks without the desired success, she inhaled on the 20th of January, 1796, a mixture of three quarts of oxygene and 19 quarts of atmospheric air. It was administered only once a-day, and in less than a week the patient was enabled to walk nearly three miles every morning for that purpose, with great ease, which she could not do at first without much fatigue; she attended afterwards with less regularity, not more than 12 doses having been inhaled in three weeks. She was sensible of its exhilarating effects, and derived a most remarkable degree of advantage from so small a number of inhalations. Her cheeks and lips acquired the ruddy glow of health, the appetite was perfectly restored, and indolence and lassitude were succeeded by activity and spirits. She had not experienced (her own expression) so good a state of health for two or three years. The Menfes had not returned at the time she discontinued the oxygene, but she has since continued in perfect health.

R. EMERSON.

*Swafham,
25th August, 1796.*

CASE.

CASE XVI.

Aug. 26, 1796. Bennet-street, St. James's.
SIR,

ELIZABETH BYWORTH, aged 17, was in service at Mr. Long's, New-Wharf, White-Friars, when from catching cold, the natural female relief forsook her, and she became subject to frequent hysterics; her countenance was bilious; she had qualmy sickness in the morning; appetite irregular; dyspnœa upon the slightest exercise, to which she felt extremely disinclined; and so great debility that she was unable to maintain her place. To these symptoms succeeded fainting, three or four times a-day; a continued disturbance in the intestinal canal; spongy gums; towards evening, chilliness; but more frequently much external heat; no perspiration; and an irregular exoneration of the bowels. Notwithstanding the methods employed, this complaint remained above three years, during which time she lived with her mother, No. 6, Water-lane, Fleet-street. In getting from thence to Bennet-street, she was above an hour and a half, and was quite exhausted with fatigue. She continued as a patient five weeks, during which time she took two emetics, aloetic and steel pills, and she inhaled daily thirty quarts of atmospheric air, super-oxygenated with six quarts of vital air; at the end of less than four weeks she was able to walk here without fatigue in half an hour; she had no sickness at the stomach in the morning; could go up an ascent without stopping, and scarcely panting; the gums ceased to bleed; the appetite was constant; the lips were red; the pulse bold and regular, instead of quick and thready; her natural perspiration returned; and the complexion was so ameliorated, that the change

did not fail to be noticed by every one. She has since gone to live as servant in a family in Old-street, being now in *every respect* in perfect health, and adequate to the situation.

From, Sir, your's sincerely,

Dr. Beddoes, R. J. THORNTON.

REMARKS

REMARKS
ON
THE FOREGOING CASES,
BY
THE EDITOR.

REMARKS

ON

THE FORTIFICATION OF

BY

THE FORTIFICATION

REMARKS.

THREE of the preceding Cases came under my own observation. They were among the worst in their kind; and the event, as far as we can perceive at present, has been eminently successful. Mr. Hare and Miss — Green I saw every day for three or four weeks; and Mr. Baynton's female patient I visited eight or nine times. In the two first instances the fits were very frequent and severe; but they were in other respects such as are commonly to be observed in spasmodic asthma. I do not therefore think it necessary to enter into any discussion concerning the symptoms. But there are a few facts which it would be unfair if I were to conceal from the reader. Mr. Hare began with one quart of oxygen air to above twenty of atmospheric, twice a-day—he never exceeded three quarts of oxygen at one dose. The morning after the sixth dose he observed some streaks of blood on a small quantity of mucus, which he had expectorated. This was not attended, nor to the present day, (Sept. 23, 1796, on which I have seen Mr. H. in excellent health) has it been followed, by any suspicious symptom. From my idea of the stimulating power of oxygen gas I felt some alarm, and persuaded my patient to desist from the use of the air for a day or two; and at this moment I believe that I should have advised the entire discontinuance of it. But Mr. H. who laid no stress upon the occurrence, was little disposed even to procrastination; and he expressed a firm resolution to run some risk in order to procure an abatement of his harassing complaint. He accordingly went on respiring diluted oxygen till the
time

time specified in his letter, since which he has not resumed it. Like many other asthmatics, he was particularly liable to catarrh; in consequence of which he never failed to have a paroxysm. Apprehending he had taken cold once or twice during the first fortnight, I ordered him four or five grains of antimonial powder at bed-time. Some London physician, in consideration of his weakened habit, had suggested to him the propriety of taking tonic medicines. I did not scruple to order pills of equal parts of extract of gentian and sulphate of iron (green vitriol), of which after leaving Clifton Mr. H. took six or eight grains a-day for some time. For this twelve-month past he has not taken an atom of any opiate or any antispasmodic medicine. The apparent improvement of this gentleman's constitution is, in my opinion, still more remarkable than the diminished frequency and force of his disorder. Oxygen air has frequently enabled persons to bear cold better; and I have met with no one who seems to have experienced this agreeable change to a greater degree than Mr. Hare.

When I was called to Miss — Green, I found her labouring under an attack of asthma, which with some small remissions, continued three days and nights. Her fits had been of late so severe as to give her friends the idea of immediate danger. Besides oxygene air, she has taken the *mineral solution* of Dr. Fowler, ipecacuanha in small doses, and likewise as Mr. Green informs me, five or six emetics since October, 1795; an emetic having been given when she perceived a *huskiness* in her throat; I suppose lest a fit of asthma should come on after a catarrh.

The circumstances observable in the last of these three patients, were exceedingly remarkable: nor do I remember to have met with a case better fitted to serve as a *study* for the physician. I endeavoured, by observation, reflection and communication with the person, whom I thought best calculated to elucidate its difficulties, to ascertain the order and connection of the phenomena. They appear to me susceptible of a tolerably compleat elucidation. And I may render an acceptable service to those who desire to penetrate into the secrets of the animal œconomy, if I here introduce the ideas that occurred to myself on the first examination of the patient, as they were committed to paper and submitted to the inspection of two medical practitioners, the opinion of the eminent physician who was consulted by letter, and the corrected judgment which the course of the disorder and the operation of medicines, have led me to form.

The unceasing necessity for cool fresh air, which obliged the patient to have the windows of her apartment open day and night for months, distinguishes this case from common instances of difficult breathing, whether belonging to the denomination, *asthma* or *dyspnœa*. In the fit, the long-continued suspension of consciousness and voluntary power is a singular occurrence; and the extraordinary quantity of bloody mucus eliminated deserves notice. This fluid was ascertained by careful enquiry to be mucus, and not saliva, as I at first suspected.

Holding these curious particulars in view, I concluded my letter to the physician, above alluded to, in these terms; “ The first impression made upon the spectators

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by

“ by these attacks has been, that they are mere asthmatic
 “ paroxysms. But the *incessant* demand for the highest
 “ stimulus which atmospheric air is capable of yielding,
 “ proves that the lungs are habitually irritable. This
 “ is not the case in ordinary asthma. The paralytic
 “ affection of certain muscles which succeeded that
 “ seizure, in which respiration was totally suspended,
 “ seems to imply a failure in the supply of vis vitæ to
 “ the system in general, and the lungs in particular.
 “ This cause I suppose would produce a general gross re-
 “ semblance to an asthmatic paroxysm. The extraordi-
 “ nary flow of mucus might be imputed to a retrograde
 “ motion of the absorbents. The class of phaenomena,
 “ which has been referred to this principle, is gene-
 “ rally marked by deficient stimulation or deficient ex-
 “ citability,—that is—by deficient excitement. On these
 “ grounds, which I need not further detail to you, does
 “ not an hyper-oxygenated atmosphere promise to do
 “ service? And might not friction and electricity be
 “ applied to the thorax with propriety? with moderate
 “ doses of opium at stated times, and also of steel? ex-
 “ traction of bad teeth?

The opinion of the consulted physician, as addressed to
 the Editor, was as follows:

“ I have considered with care both the letter you have
 favoured me with, and that from Mr. Baynton, concern-
 ing the case of Mrs. —. As I understand that the pa-
 roxysms are always attended with difficult respiration,
 though not preceded by it; and as she frequently wishes
 for fresh or cool air; and lastly, (as mentioned in Mr.
 Baynton's letter) as she has very frequently miscarried;

I am

I am induced to believe these paroxysms to be asthmatic ; and on that account should recommend the trial of oxygen gas diluted with atmospheric air. As there is reason from your original observation to believe, that pregnant ladies expend more oxygen in supplying it to the fœtus, than when they are not in that state ; I have lately directed a lady, who has very frequently miscarried, to inhale oxygen, and so far I hear with good event.

Secondly, as she becomes quite insensible to external objects during the last part of the paroxysm, this seems similar to the stupor which generally terminates epileptic fits ; and differs from syncope, in which, (according to Cullen) the motion of the heart is stopped or diminished.

My general idea of this disease is, therefore, that it is an asthma of the convulsive or epileptic kind. The good effect which she has generally received from an opiate, when given soon enough, seems to confirm this idea of the disease.

1. I should certainly advise, as you have suggested, an extraction of those teeth, which are so far decayed as to be useless to her.

2. The respiration of oxygen gas once or twice a-day.

3. Daily equitation, or friction, or other exercise ; she should live in well ventilated rooms, both parlour and bed-chamber, and, if it can be done, go from home for change of air. Electricity also is worth trying.

4. In respect to medicine she should, if you approve, take half a grain of opium in a small pill twice a-day, as at breakfast and at going to bed. Which, if she again

becomes pregnant, should be increased to a grain twice a-day, and should be persisted in for *many* months, so as to introduce a new habit of increased energy in the whole system.

5. Her habits of life should be regular, that is, she should go to bed by ten, and drink nothing stronger than wine diluted with thrice its quantity of water, or very weak small-beer.

6. Some medicine, which evidently increases the pulmonary exhalation, should be used, as a draught twice a-day, consisting of balsam of Canada or Peru a scruple, dissolved in a drachm of honey and an ounce and half of water, and a drachm of tinct. cinnam.—or asafoetida in pills or solution. onions? garlie?

7. If the returns of the paroxysms can be foreseen, an addition of opium, as 20 or 30 drops of the tincture, should be given half an hour before the expected attack, and omitted at other parts of the day."

On a retrospect of circumstances one can, I think, scarce hesitate to pronounce the complaint *a defect of energy in the pulmonary capillaries and lymphatics*. At the time of the most formidable seizure, this was so considerable that the red particles of the blood found their way along with the mucus either through the exhalants or the absorbents. The distress, occasioned by the debility of these vessels, when this debility was greater than common, might, indeed, easily excite spasms in the muscles of respiration: and, if so, the fit would be truly termed a fit of epileptic asthma. But as asphyxia will come on from a given inaction of the capillaries of the lungs, arising from an internal constitutional cause, with no less certainty

certainly than from immersion in an unrespirable medium, there might in these fits have been nothing of spasmodic contraction of the diaphragm or other co-operating muscles. I could not ascertain the existence of stricture by enquiries from the patient. The violent fit of May 23d, 1796, came on immediately after a voluntary exertion, which for such a patient must be deemed considerable. She rose out of bed (probably in some haste) to view a procession passing along the street. And I apprehend an effort of this kind, in which body and mind were concerned, might have exhausted so much of the power of life, as to occasion the subsequent asphyxia and paralytic feelings.—No attentive reader of Mr. Baynton's communication can be at a loss for the cause of the weakness in the vessels on the surface of the lungs. He speaks of a catarrh and cough of many months' continuance as preceding the other complaint. Add to which, the patient has, in my opinion, a decidedly *irritable* temperament.

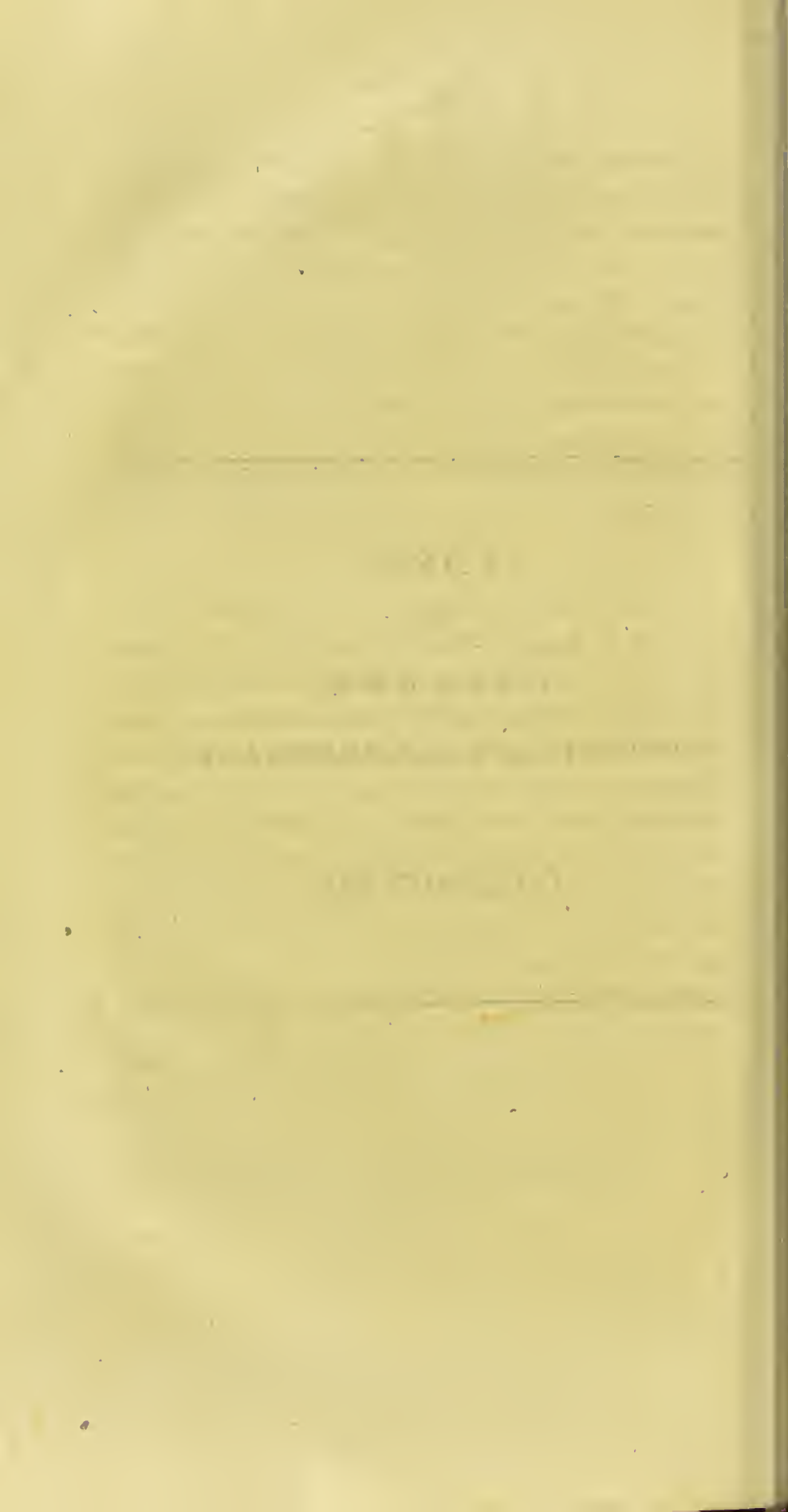
During Mrs. —'s continued use of the (so-called) *tonic* medicines she felt some abatement of her complaint. She sometimes breathed with unusual ease, and once found herself so well as to undertake a walk of above two miles, an exertion to which for a long time before she had been nothing like equal. But the amendment lasted only for a little while; nor, though in a high and open situation, was she two whole days and nights without an anxious sense of want of fresh and free air: The cold-bath alone produced the continued feeling and the assurance of restored health. The fits seemed to have a tendency to return with violence once a month; and two of these periods have now passed without a token of relapse.

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The effect of oxygen diluted in the dose of 2—5 quarts a day did not appear to me very striking: and this case seems to confirm the inference deducible from Mr. Kentish's observations on Capt. Hemfley; *that oxygen directly stimulates the blood-vessels only; and not the absorbents.* If a chamber filled with modified air had been at my command, the effect of air moderately hyper-oxygenated and respired long might have been well ascertained by this case; and so, if a proper establishment had existed, might the identity or difference in medicinal effect between oxygen from growing vegetables and from minerals.

The benefit to be expected from the cold-bath in similar cases is the great practical moral to be drawn from this history. Mrs. ——— glowed much after its use; and it may be concluded that such energetic action of the capillaries of the skin, communicating itself by sympathy to those of the lungs, restored to them their healthy powers. Possibly the preceding liberal use of tonics was not indifferent to the degree of success which has been experienced in this instance. Since the publication of the work mentioned by Mr. Baynton, I have been attentive to the use of the cold-bath in undoubted spasmodic asthma; and as several of the worst possible cases of this disorder have come under my care, I am in possession of some important facts on this interesting subject. These facts are at this moment accumulating; and I shall present them to the world either in the Appendix to the present pamphlet, or in some future publication.

CASES
OF
CATARRH,
PULMONARY HÆMORRHAGE,
AND
CONSUMPTION.



CASES.

CASE XVII.—*Catarrh.*

I SHOULD not trouble you with the following fact respecting hydrogen gas in the inflammatory stage of catarrh, were it not supported by analogous cases in which sometimes unrespirable airs and sometimes æther-vapour have been employed.

Friday, Feb. 19, 1796, I felt indisposed with slight symptoms of Fever, accompanied with that particular sensation in the chest which I had been much accustomed to feel at the commencement of violent catarrh. In this situation I dined with a medical friend and imprudently drank more than a pint of wine. I passed a restless night, and in the morning all my symptoms were increased. The mucous membrane of the nose was greatly affected, and I began to cough frequently and painfully. I procured some hydrogen gas, two quarts of which diluted with twenty of common air, I inhaled twice in the forenoon. Not finding relief, I determined to use undiluted hydrogen, as often as I felt a disposition to cough. I fitted a perforated cork provided with a stopper to a bladder of at least three gallons capacity. Having expired forcibly, I put the cork to my mouth ✓ and drew in the hydrogen, and then expired it into the bladder: this I did whenever I felt a disposition to cough, from which I restrained myself as much as possible. The next morning I felt myself considerably relieved. I had recourse again to the hydrogen, sometimes breathing into the bladder, and at other times slowly through

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the nostrils, to relieve the disagreeable sensation I experienced there. Monday I felt the disposition to cough very trifling, and Tuesday I had not the slightest remains.

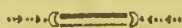
From what I have before experienced (and I have been extremely troubled with violent catarrhs) I am persuaded that the benefit arising from the use of factitious air in twelve hours is greater than that which would be obtained in a week from the usual mode of practice.

I have not (fortunately for myself) had an opportunity of again making trial of its efficacy, but it will certainly be the first remedy to which I shall have recourse in a similar situation.

I am, dear Sir, your's truly,

To Dr. Beddoes.

THOMAS ROLPH.



CASE XVIII.

Pulmonary Abscess.

No. 435, Oxford-street, Sept. 1, 1796.

SIR,

I AM happy to find that the ideas you first suggested respecting the nature of consumption are likely soon to meet with an ample investigation by the establishment of a Pneumatic Institution. Patients were long since sent from their families and home under the supposition that the air of other climates better suited their disease than our own, but what was the effect of air on the constitution scarcely ever entered into the consideration of the practitioner, much less to turn it *here* to any account.—

The

The enclosed case will confer considerable weight on the mode of treatment you suggested, and as Dr. Thornton will send you the progress, I shall only lay before you the state of my patient, previous to my recommending him to the care of that indefatigable and ingenious physician, and shall add a few words respecting his present condition of health.

Mr. Dorgan, married, having a family, aged 41, was with a party of friends at Deptford, Feb. 10, 1796, where he was induced rather to exceed in the quantity of liquor, and the evening turning out rainy, was wet through: the next day he was seized with shiverings, succeeded by flushings of heat; head-ach; violent pain in the right side; difficult breathing; dryness of the nostrils; and other marks of an incipient peripneumony; the symptoms were so violent as to oblige him to take to his bed. I was immediately sent for, and from the urgency of the case, I thought it right to call in the aid of a physician, Dr. —, who ordered him to be bled, blistered, as well as pursuing the other antiphlogistic methods which are usually practised in this complaint. After fifteen days Mr. Dorgan was able to leave his bed; but the cough still continued with copious expectoration, which upon trial with water sunk to the bottom.—We continued our attendance to the 24th of March, when from the rapid progress of the disease which had all the appearance of phthisis pulmonalis, we recommended the trial of the hydrogen, or hydrocarbonate, air. From his being a very corpulent man, he was so far reduced, that his clothes sat like a sack on his body; naturally of a strong make, he was so weakened, as to be obliged to use a stick; constantly harassed with a hollow cough

which produced purulent expectoration to the quantity of a pint during the twenty-four hours, accompanied with hectic fever, drought, colliquative sweats during the night and in the morning, loss of hearing, his eyes dim and sometimes for a few moments failed him; his appetite was gone, indeed every thing seemed to prognosticate a speedy issue. Under these inauspicious circumstances he began the trial of a reduced atmosphere, and indeed we had not the smallest expectation of his recovery, the disease appearing so extensive in his chest.

I am happy that our prognostics failed, and to add I have since seen Mr. Dorgan, and he is free from cough; has no night sweats; has recovered his former bulk; and looks as fine and hearty a man as any we may meet with in a hundred.

I am, Sir, &c.

To Dr. Beddoes.

WILLIAM DEAN.



Journal of this Case.

March 25. Mr. Dorgan, living in Church-street, Bloomsbury, ætat. 41, was attacked with Pneumonia, which terminated by a diseased secretion, or abscess of the lungs, occasioning chill in the day, hectic fever at night, and profuse perspirations, more especially towards morning, great emaciation, and extreme debility; what he spit up sunk in water, and upon examination with a strong lens, it appeared filmy, and covered with small air-bubbles, and was of a clear straw colour. Feels un-
casiness

easefulness upon making a deep inspiration, complains of a dull pain at the sternum, a harassing cough, dimness of sight, (perhaps from previous inflammation of that organ) thickens of hearing, (probably also arising from the violent cold which was the foundation of the present disease) hoarseness, more especially towards night; has a tongue extremely white, edges rather florid, pulse 110, rather full and tense, appetite gone, spirits unusually depressed, but possesses great fortitude of mind. Mr. D. has the appearance of being formerly a very stout man, is near six feet high, his eyes are weak and blue, his complexion fair, his hair light, and he was before often subject to very severe colds. Ordered a large blister on the sternum, an aperient in divided doses, and the syrup of white poppies at night.

March 27. No alteration.

Ordered the aperient and syrup to be repeated, and a fleecy hosiery waistcoat to be procured as a substitute for the flannel. Inhaled a reduced atmosphere, viz. one quart of hydro-carbonate to forty of atmospheric air, had continual catchings of his breath as he inhaled it, his pulse which was 110, full, and strong, was rendered soft and feeble, and rather quickened. Felt some uneasiness at his breast at the time, a little faintness, vertigo, and sickness, which prevented him from inhaling the quantity prepared.

March 29. Feels rather more debility, with acute shooting pains in the side.

Ordered another blister, and an aperient. Inhaled a reduced atmosphere, the same effect nearly as on the 27th.

March

March 31. Free from pain in the side, but no other-wise amended.

Ordered a Burgundy pitch plaster on the sternum of a large size, a tonic mixture of bark and myrrh, an emulsion of milk and oil of almonds made up with gum arab. and sugar, and the anodyne syrup at night. Inhaled a reduced atmosphere, the catchings were inconsiderable, it produced a soothing refreshment, and a sense of coldness at the time, which was succeeded by the mildest glow, and pulse 90, soft and feeble, which increased to above a hundred soon after the inhalation.

April 1. Is much mended, slept throughout the night, and what is expectorated is less filmy, and sinks with some difficulty.

Ordered the same medicines, but instead of the tonic mixture at night an aperient, and the tonic to be resumed the next evening, and the following morning.

April 3. Amendment visible.

Repeated the medicines as on the 31st of March. The reduced atmosphere no longer produced nausea or vertigo, but a soothing tranquillity, and a diminution of pulse. No catchings of the breath, and the inspirations were deeper and easy.

April 4, 5, 6, 7, 8. All the symptoms of disease are diminished.

Pursued the same medicines as were ordered March 31.

April 9. The appetite is keen, feels his strength considerably increased, so that instead of an hour and a half, he walked here in little better than thirty minutes, the
cough

cough is less troublesome, what he expectorates is chiefly in the morning and evening, nights good, no pain, entertains the hope of a speedy recovery.

April 10. Continues mending.

Ordered an aperient, as on April 1. Continues to inhale a reduced atmosphere.

April 12. Continues mending, before obliged to use a stick, now had left it behind, having no occasion for one. Upon examining the expectoration the greater part swam, and only after some agitation did some lumps sink in the water.

April 13. Left off a great coat, feels to-day a violent stitch in the right side, cough increased, considerable hoarseness, tongue very white, pulse 90, full, eyes heavy, strength diminished, much irritation at the breast.

Ordered a blister, and an aperient to be taken in divided doses, the tonic mixture to be discontinued, and an aperient to be repeated again the next morning. Inhaled a reduced atmosphere, which occasioned violent catchings of the breath, as at first, and therefore it was persisted in only for a few minutes.

April 15. Pain subsided, cough much abated, no hoarseness, complexion much improved, pulse 76, says "he feels much better to-day than for a long while."

Ordered the tonic mixture to be resumed in increased force, and directed porter at his meals, and a more generous diet. Inhaled the reduced atmosphere with advantage.

April 16, 17, 18, 19. Cough very moderate, the expectoration has ceased to have any unpleasant taste, and swims

swims for the most part on the surface of the water. It has a browner cast, and appears bluish in the morning.

April 20, 21, 22, 23, 24. Continues mending, seldom coughs, appetite extremely good, spirits elated, thinks he will be well in a few days.

Ordered the opium to be left off, and less of the tonic mixture to be taken.

April 25, 26, 27, 28, 29. Daily mends, never coughs but in the morning, and towards evening, and what he expectorates floats, is increased in bulk; nor has he need of the opium.

Ordered the bark and hydro-carbonate to be left off for a week, and the patient to go into the country.

May 10. Mr. D. returned, perfectly recovered.

Sept. 1. Saw Mr. Dorgan, who has since continued in excellent health, and has no apprehension, or I trust, danger of his former complaint, the disorder being rather *acquired*, than natural to his constitution.



CASE XIX.—*Consumption.*

Aug. 13, 1796. Bennet-street, St. James's.

ROBERT SCANTLEBURY, married, aged 35, living at No. 33, Crown-street, Finsbury-square, has laboured under a disease of the chest nearly seven years. He imputes its origin to a violent cold, leaving behind a cough, which was very troublesome during the Winter, and at first constantly disappeared in the Summer months.

For

For the last two years he has experienced no intermission. He spits up a great deal of a *something*, which, when put into a glass of water, appears white and flocculent, and soon subsides to the bottom, and when viewed by the microscope shews the appearance of a thin web replete with air-bubbles. He had seldom above two or three hours sleep, so troublesome was his cough. He had feverish heat towards evening, which diminished by sweating in the morning; a parched white tongue, with florid edges and spots; chilliness during the day; and a circumscribed red spot on the cheek-bone. He often complained of a dull pain under the sternum; hoarseness towards evening; and so much debility, that he was above two hours in getting to my house in Bennet-street, repeatedly taking hold of the rails of houses, as he went along. His appetite was good, and what seemed rather unusual in his complaint, he had little or no expectation of recovery, which perhaps might arise from the continual good-nature of honest friends, who were constantly expressing their concern at his situation. He had taken a deal of medicine without benefit. The plan I pursued with him, was emetics and cathartics to make the bark agree; syrup of white poppies at night to assuage the cough; and he inhaled the hydro-carbonate in the proportion of one quart to forty of atmospheric: He was ordered a fleecy hosiery waistcoat; and had a large Burgundy pitch plaster on the breast. The reduced atmosphere invariably produced a general sense of coldness and refreshment over the frame; and at first slight vertigo, and nausea, which soon disappeared, and ever after, he went away under the persuasion he was mended by the hydro-carbonate, and soon acquired the full confidence, that he should speedily recover; nor was this

expectation fallacious ; for his cough daily grew less incessant, his nights were seldom disturbed, he felt his strength so far increased, that he could walk here in half an hour ; and what he spit up was bluish, or resembled clear mucus, which swam on the surface of the water. He ceased to have exacerbations of heat and cold, with perspiration in the morning, and his friends universally noticed the surprising alteration in his looks. After five weeks he took his leave, without cough ; increased in flesh ; and seemingly perfectly recovered of his former complaint

Sincerely your's,

To Dr. Beddoes.

R. J. THORNTON.



CASE XX.—*Consumption.*

SIR,

AMY CHATFIELD became my patient on the 23d December, 1795, and continued so till Jan. 20, 1796. Her complaints were cough, pain, and great tightness at her breast, frequent and hard pulse, and very considerable spitting of blood. She was bled and blistered, and took sedative and gently opening medicines, which at first relieved her ; she had less pain, and the hæmoptoe was considerably diminished. I attributed the relief she experienced more to the bleeding and blistering, than to the medicines she had taken, and was desirous of repeating them ; but she was not to be prevailed on ; I therefore discontinued my visits.

She

She is a woman of a fair pale complexion, with light hair approaching to red. Her lady, Mrs. Bourke, asked my opinion of her ; I told her that her situation was such as to give very little hopes of recovery, and as she was incapable of doing her business, recommended her being sent to the country. From the above time till the 7th inst. I had scarcely seen her ; and indeed was *surprised* at the very great change that had taken place in her health. Her face, though naturally pale, appeared healthy ; she said her appetite was good, that she was capable of doing her business, and that she was perfectly well.

Sept. 15, 1796.

H. COATES.

Howland-street, Fitzroy-square.

Journal of Amy Chatfield's Case.

April 9. Amy Chatfield, æt. 25, lives as servant at Mrs. Bourke's, No. 50, Charlotte-street ; for several months has had hæmoptoe, her expectoration is now streaked with blood, sinks when immersed in water, cough hard and frequent, tongue florid at the edges, countenance pallid, except when attacked with fever, which comes on towards evening, perspirations in the morning, emaciation, breathing oppressed, a tightness, like a rope, across the breast, so much debility that she was above an hour and a half in getting to my house in Bennet-street, leaning on the arm of a companion, and sitting down upon the stone steps of houses six or seven times in her way.

Ordered the syrup of white poppies, and an aperient draught.

N 2

April

April 12. Expectoration as before, sleep very disturbed, awakened with violent head-ach, and sickness of the stomach.

Ordered an emetic and cathartic, and the opium to be omitted.

April 14. Brought off a quantity of viscid mucus from the stomach, feels to-day lighter, and much mended. Expectoration as before.

Ordered a fleecy hosiery waistcoat, a cathartic, and a mixture of bark, myrrh and steel, and the opiate to be resumed.

April 16. Feels stronger, and only rested once in getting here, complains of a tightness across the breast, stitches in the side, much heat at night, giddiness and head-ach, disturbed sleep, and cough very hard. Pain when making a deep inspiration, and a catching of the breath.

Ordered the tonic to be omitted, and directed a tonic aperient of rhubarb quassia and coriander seeds to be taken at night, the bark mixture without steel to be resumed the following day.

April 18. Is much mended. The expectoration is less streaked, and appears now spotted with blood, and studded over with air-bubbles. Sinks in water.

Ordered the tonic mixture to be repeated and the aperient each night.

April 21. Walked here without leaning on her companion, and only sitting down once; slight stitches in the side;

: expectoration as before. Repeat the medicines of yesterday.

April 22, 23, 24, 25. Continues mending; expectoration diminished, and rather less spotted with blood. Pains in the loins. Signs of menorrhœa. Omit. medicamenta.

April 26, 27, 28. Menorrhœa, pale, copious, during which time she was unusually well; but the expectoration was much streaked with blood, and less fludded.

April 29. At nine in the evening was taken exceedingly ill; had violent head-achs, shiverings, flushes of heat, great pain in the loins, shortness of breathing, drought, no appetite; passed a bad night.

In getting here, May 1, was obliged to rest four or five times by the way, looked exceedingly ill; expectoration more streaked with blood, complains of some pain and rumbling in the bowels; ordered the tonic aperient, and the bark mixture after the bowels were cleansed.

May 3. Sat down thrice in walking here: the expectoration was less streaked and spotted with blood; and of a browner colour, and more disposed to swim.

Ordered the bark mixture to be repeated, and the opiate at night, with a tonic aperient pill of aloes, gentium, myrrh, and steel.

May 4. Strength much increased, countenance more healthy, expectoration browner, not streaked, and less fludded with blood, sleep undisturbed, cough easy, appetite good.

May

May 5, 6, 7, 8. Mends daily: expectoration very little spotted with blood, of a dark brown, and swims.

May 9, 10, 11, 12, 13, 14. Continues mending; has increased in flesh; the medicines have produced a total alteration in her appearance, so that few would believe her to be the same person; seldom expectorates.

May 20. Has left off medicines, thinking herself quite well.

September 3. I learnt that Amy Chatfield has had no return of her disorder, and has continued with same family in excellent health.

During the time Amy Chatfield was under my care, she inhaled a quart of hydro-carbonate a day, diluted with 30 of atmospheric air, and felt at the time of inhalation a cool and soothing effect; and at first slight giddiness and nausea; but these soon went off. These effects however were not so conspicuous, as when she inhaled the vapour of æther, which was employed five or six times. This produced little or no nausea. It seemed to soften and enfeeble the pulse; but, after the process was over, it rose, and appeared soft and fuller. As the air was drawn over a large reservoir of cold water, did it not serve as a temporary cold bath, bracing the vessels of the lungs?

London,

London, Sept. 17, 1796.

SIR,

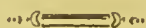
I PLACED myself under Dr. Thornton's care last June, being subject to hæmoptoe, and bloody and purulent expectoration sinking in water. I had previously, without benefit, but rather with an aggravation of my complaint, tried the air of the country. I inhaled at Dr. Thornton's daily a quart of hydro-carbonate, mixed with thirty of common air. It produced at first considerable vertigo, and afterwards much refreshment and a pleasing tranquillity. This was conjoined with the exhibition of bark and Columbo root, and I was evidently mending. When, at the commencement of August, the weather setting in extremely hot, I left off the reduced atmosphere, but continued the tonic mixture : and, being rather hurried in business, I was in consequence seized with considerable hæmoptoe. The subsequent attacks have, however, been trifling ; having, by the direction of Dr. Thornton, at the instant immersed my hands and feet into water, which was surrounded by æther, and a solution of sal ammoniac in water ; and then keeping them for some time in the air : after which I took aperients, and next tonics ; and it is now three weeks, and I have had no returns whatever of hæmoptoe, nor is my expectoration streaked or spotted with blood. The fever at night, and perspiration in the morning, are, however, very oppressive ; and having inhaled on the 6th current two teaspoonsful of æther from a tea-pot, I remarked, with another gentleman, that my pulse, which was about 98, sunk at the time from six to eight beats in the minute,

nute, and continued throughout the night considerably less full, but equally quick as before. The subsequent effects of æther have been always to soften and enfeeble the pulsations.

I am, Sir, &c.

To Dr. Beddoes.

WILLIAM COCHRAN.



Note on this Case.

IN the case of Mr. Cochran, an apothecary, living in Broad-street, Golden-square, who had been for some months subject to hæmoptoe, which had terminated in purulent expectoration, streaked with blood, the benefit from the hydro-carbonate was not equally conspicuous: but here it ought to be observed, that anxious to do good, and advance himself in his profession, during the time he was under my care, he pursued his avocations, and attending a labour at night, with other exertions, probably brought on a serious return of hæmoptoe: but he still persists in his desire of the hydro-carbonate, convinced it had done him some service; and two physicians, Dr. Underwood and Dr. Shaw, his intimate friends, whom I called in, approving of it, it will be resumed. Mr. Cochran took no steel. The sequel of this case I propose giving at some future time.

I am,

Most truly your's,

R. I. THORNTON.

CASE, XXI.

Birmingham, Aug. 15, 1796.

DEAR DOCTOR,

I SEND you the following case of Pulmonary Hæmorrhage, wherein the effects of a medicated atmosphere appear to me to have been decisive. The factitious air was prepared and given by James Watt, Esq. of Heathfield; with whose intimate knowledge of this branch of medicine you are well acquainted.

Richard Newberry, aged 46, a labourer; of a tall and slender make, sanguine temperament, and who, previous to the attack which I shall describe below, enjoyed good health; was, about the beginning of the month of May last, in consequence of repeated intoxication* and exposure to cold, seized with hæmoptysis. I saw him some days thereafter; when he complained of pain in his side, and cough, attended with copious expectoration of frothy mucus, for the most part mixed with blood, which was dark and grumous, but at times of a florid colour. His pulse was frequent, and had some degree of hardness; his tongue was white, and he had considerable thirst; his bowels were regular, and his appetite much diminished. For several evenings after the first attack, Mr. Watt, whose servant he is, gave him a pint of hydro-carbonate, properly diluted; and which he uniformly inhaled, with the evident good effect of diminishing the heat of his body, and of rendering his pulse soon after both slower and softer. By this treatment the pain in

O

his

* Naturally of a sober turn.

his side, and cough were so much mitigated, as to suffer him to pass his nights in sleep ; but, as the pain returned with increase in the morning, accompanied by more frequent cough, I directed that a blister should be applied to his side, and that every four hours he should take, in the form of a pill, a mixture of squill with a small proportion of ipëcacuanha, and that the modified air should be continued. The pain of his side was much relieved by the blister, and did not afterwards return in the morning; but in the morning after its operation his pulse was much increased both in strength and frequency; and in that state continued until the evening; when, as formerly, in both respects it was much diminished by the repetition of the hydro-carbonate. The proportion of modified air was now increased to a quart every evening, and continued to occasion, during the inhalation, a grateful sense of warmth in the breast, and slight vertigo; and in the nights to produce sound and refreshing sleep. After this manner he proceeded; the expectoration becoming evidently purulent and offensive, but gradually less mixed with coagulated blood: when, about fourteen days from the date of the first hæmorrhage, having been employed in threshing out some corn, the hæmoptoe returned in considerable degree, preceded by the usual symptoms of flushed cheeks, sense of weight in the breast, with some degree of pain, accompanied by a hawking cough. Mr. Watt, judging by the former beneficial operation of the modified air, and finding his pulse upon this occasion very strong and quick, and his skin very hot, increased the proportion of hydro-carbonate to two quarts, with the most striking advantage; his skin soon thereafter becoming cooler, and his pulse much softer and slower. He passed a good night; but in the morning, when I saw

him,

him, he complained, as at first, of his side, coughed frequently, and expectorated blood in considerable quantity. As a blister formerly had removed his pain, I directed another to be applied to his side, which had a similar good effect; and that he should continue the use of the squill and ipecacuanha pill, but in an increased dose. On the third day after the second hæmoptoe, an eruption of the erysipelatous kind spread itself over his right thigh and leg; which induced Mr. Watt to augment the quantity of lactitious air to three pints, twice a day. The discharge of blood soon ceased, and the expectoration again assumed the purulent appearance and offensive smell above described. In a few days the eruption disappeared, and the secretion of the lungs losing its fetor, was expectorated in usual quantity and of its natural quality. He continued a few days ago in perfect health.

On the foregoing case I shall only observe, that Newberry himself uniformly expressed much thankfulness for the benefit he invariably received from breathing hydro-carbonate. Had the inhalation of the modified air been repeated more frequently, would it not alone have been adequate to the complete removal of the pain of his side, and consequent cure? As the squill and ipecacuanha pills never produced any sensible alteration, much cannot be attributed to them in the successful result.

I remain most sincerely your's,

To Dr. Beddoes.

JOHN CARMICHAEL.

CASE XXII.

*Letter from Mr. CHAMBERLAIN, Apothecary, to
Dr. THORNTON.*

Aylesbury-street, Clerkenwell,

SIR,

Sept. 25, 1796.

I CANNOT hesitate in the least sending you the statement you require. I do not think it possible, that you could have a case of Phthisis pulmonalis more strongly marked, than that of my patient Wm. Roberts; of whose situation, prior to his happy application to you, the following is a just account. On the 14th of November, 1796, when he first applied to me, he complained of heat, pain, and oppression about the sternum; he had a hard and hollow cough, and the expectoration was salt, greenish, and usually tinged with blood. I gave him a gentle emetic, and treated him in the usual way with expectorants, lac ammoniacum, myrrh, and the different preparations of squills, with anodynes occasionally interposed; but, in spite of every effort on my part, he daily grew worse; till at length he became so bad, that his emaciated body, hollow jaws, hectic fever, night sweats most profuse, eyes sunk in his head, with total loss of strength, and excessive coldness of his feet and legs, seemed to indicate approaching dissolution; and, with so much apparent certainty, that I advised his wife to prepare for the worst; and even warned the patient to settle all his worldly affairs, as his danger was great. He in consequence left off medicine, and resigned himself wholly to an event, which I thought inevitable; when he fortunately heard of you, and of your surprising success
in

in a case*, which appeared nearly as bad as his own. He next day, in consequence, roused himself so far as to get to your house ; but he fainted away upon his return home. His wife brought me the prescription ; when I candidly tell you, I said, “ It is to no purpose, for neither Dr. Thornton with his airs, nor the whole college of physicians, with Sir George Baker at their head, can save your poor husband.” But he had not been a week under your judicious management, when the alteration produced was a matter of the greatest astonishment, both to myself and others. I need not contrast his present altered situation, and the great benefit unequivocally derived from your practice ; as you mention you propose sending yourself an account to Dr. Beddoes. I have the honour to sign myself, therefore,

Sir,

With the sincerest respect, &c.

WILLIAM CHAMBERLAIN.

* This was the case of Mary Kimber, recorded by Mr. Townsend in his *Guide to Health*, Vol. II. p. 274 ; who was recovered principally by means of the vital air, after her physician, Dr. Myers, had pronounced she would not live a fortnight. She has now remained above six months in perfect health and spirits ; nor has she the smallest sign at present even of indisposition. Knowing the forlorn state of the child, when I heard of the recovery, I went to the parents, that I might have ocular demonstration ; and am happy to bear testimony to so extraordinary a fact. The case of this child was however very different from that of Roberts, as it was confirmed ascites.

Journal

Journal of Mr. ROBERTS's Case.

March 15. William Roberts, aged 34, married, caught a most violent cold in November, 1795, which settled in the breast; accompanied with acute pain on the right side, difficulty of breathing, expectoration streaked with blood, a hard cough; for which he was blistered, and the usual antiphlogistic remedies applied. It soon after terminated in phthisis, viz. hot and parched skin in the evening, profuse perspiration in the morning, drought, chilliness in the day, debility, emaciation, and purulent expectoration. He consulted Dr. Wills, physician to the Finsbury Dispensary; who, after attending him for some time, declared to his wife, that no medicine could be of any service, and that he was in a deep decline, and his only hope was his going into the country. He then consulted Mr. Myers, who was of the same opinion; and, having next applied to Dr. Pitcairne, he also told him, medicine would render him no service, and he must go into the country.

Ordered an emetic, and tonic cathartic of rhubarb and vitriolated kali; and, after their operation, a tonic mixture of bark, compound tincture of the same, and myrrh.

March 17. Cough hard and troublesome.

Ordered another aperient.

March 19. Cough more urgent.

Ordered an emulsion of oil of almonds, milk of almonds, sugar and gum arabic; syrup of poppies at night; and the tonic mixture to be resumed.

March

March 20. Strength increased ; the night's sleep less disturbed ; cough less urgent ; costive.

Ordered a tonic aperient pill of aloes, myrrh, vitriolated iron, and extract of gentian. The other medicines to be taken as before :—a Burgundy pitch plaster to be applied to the sternum.

March 21 to 25. The tonic pills and opiate were ordered to be omitted.

March 26. Cough urgent.

Ordered the opiate to be resumed.

March 27 — 30. Cough less troublesome ; strength increased.

Ordered the same medicines to be continued.

April 1. Strength considerably increased : said, he “ walked ten miles in three hours,” and has returned on foot from Woolwich, and felt no fatigue.

April 2. Expectoration diminished, perspiration less profuse, appetite keen.

Ordered the same medicines to be continued.

April 3—14. Amendment great. Expectoration not streaked with blood, but still sinks in water.

April 18. Walked from Woolwich this morning, and said he felt neither fatigue in going there or returning.

Ordered vitriolated iron and extract of bark, to be taken with the tonic mixture. The opiate and emulsion to be omitted.

April 25. Night sweats wholly gone, only a slight cough in the morning ; what he expectorates, when immersed

mersed in water, swims; except some small pieces, which detach themselves upon agitation; nights good, spirits alert; for several months had been obliged to leave off his trade; now follows it with satisfaction to himself; says, he "ails nothing now but a slight cough."

Ordered the tonic medicines gradually to be left off.

April 30. Appears light and active, has acquired flesh, spirits great, appetite good, coughs but seldom, has however hecking occasionally.

Ordered the medicines wholly to be left off, and now and then a little gum Arabic to be put into the mouth.

Sept. 29. Saw Wm. Roberts; he has the appearance of health, and says he has enjoyed good health since his recovery. Advised him to ward against the autumn by a fleecy hosiery waistcoat.

Observation. From the copious expectoration of this patient, I conceived he had a catarrhal defluxion from the lungs, local irritation, and general debility. To take off the local irritation he inhaled a reduced atmosphere, formed of the hydro-carbonate a quart, to fifty of atmospheric air; and he had a Burgundy pith plaster applied to the sternum; and when inflammation was indicated, an aperient. The absorbents were excited to action, first by an emetic, and probably by the hydro-carbonate and tonic medicines; which last tended also to counteract morbid debility and irritability. These ideas however I only mention as surmises, referring the juster explanation of causes to you who first suggested the means.

To Dr. Beddoes.

CASE XXIII.

Note respecting W. DENCH, by Mr. KNIGHT.

SIR,

THE bearer, who is in Mr. Bensley's employment, has been tormented by a violent cough for the last eighteen months. He has been under several medical men, but has derived no material relief; therefore I have taken the liberty to recommend his case to your consideration, being persuaded that you will be abundantly gratified if you can restore him to health.

I am, Sir,

Your's, &c.

To Dr. Thornton.

J. KNIGHT.

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Journal of Mr. DENCH's Case, by Dr. THORNTON.

May 10. William Dench, printer, married, aged 36, has been, for some months, subject to a violent cough; perspirations in the morning, emaciation, debility, a dull pain at the breast, purulent expectoration, flocculent, and sinking in water; which experiment was tried in his presence; voice hoarse, breathing oppressed, tongue clean, appetite moderate.

Ordered an emetic of ipecacuanha, and a cathartic of rhubarb and vitriolated kali.

May 12. Symptoms the same; feels rather weaker.

Ordered the cathartic to be repeated.

May 14. Less pain under the sternum : rather weaker.

Ordered a tonic mixture of decoction of bark, compound tincture of the same, myrrh, and columbo ; syrup of white poppies at night and in the morning.

May 15. Slight stitches in the side, sickness at the stomach and head-ache.

Ordered a Burgundy pitch plaster, and an emetic at night. The opiate to be resumed the night after.

May 16 to April 8. Continued the opiate night and morning, and the tonic mixture in the day, with tonic aperients *pro re nata*.

April 9. Cough free, breathing easy ; no profuse perspiration at night ; upon going up stairs formerly obliged to rest ten minutes before he could possibly proceed to work ; now, to use his own expression, he " has at it immediately ;" appetite good, sleep undisturbed.

Ordered the syrup to be omitted.

April 16. Seldom expectorates, and what is coughed up appears to be chiefly mucus.

Ordered the tonic mixture gradually to be left off.

April 18. Came to me to return thanks, being, as he thought, *cured*.

Sept. 20. Has experienced no relapse ; looks well, and says " he feels very hearty ;" he is subject, however, to catarrhs.

Observations on this Case.

Mr. Dench frequently inhaled, once a day, a reduced atmosphere, and felt vertigo at first. The quantity was a quart of hydro-carbonate to thirty of atmospheric air. Upon dissection I have often found signs of a *morbid secretion*, and no ulceration: and, where the expectoration is *copious*, may we not reasonably suspect this rather to be the case, than that what is coughed up is formed from an ulcer? Are not tonics indicated in diseased secretions? and may not the hydro-carbonate give tone to the absorbents? Is not the leucophlegmatic consumption a disease of the absorbents, often previously manifested by tumid glands, though these in an advanced period are rarely to be found?

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CASE XXIV.

SIR,

I HAVE sent you the enclosed, as drawn up by the Gentleman who was constantly with the patient. Having frequently seen this lady previous to the time I ordered the hydro-carbonate, I had but little doubt, but that the pain in the breast, hoarseness, &c. were the precursors of tubercles; for her habit is remarkably scrophulous; and, as a variety of means had been tried, I really considered the air as a forlorn hope. She has no
doubt

doubt of its efficacy, and has continued to enjoy a perfect state of health till this time.

Your's, &c.

To Dr. Beddoes.

J. ALDERSON.

Sept. 26, 1796.

P. S. Mrs. B. always found the air to have no intoxicating effect if not taken immediately;* and that without that effect it procured no sleep.

* After being made, I suppose.—*Editor.*

Journal of Mrs. B——'s Case.

Mrs. B. about 34 years of age, scrophulous habit, subject to eruptions in the face; early in the spring of 1795, in the evening, complained of a slight pain in her throat, and some difficulty in swallowing; which increased so much before the morning, that it was with great difficulty she could swallow a table spoonful of liquid; great pain in the throat and breast, a very hoarse voice; spoke very low, and great pain in speaking; a hot dry skin, pulse 100, great thirst.

Neutral mixtures, with spermaceti and opium, with blisters to the back and breast, brought on a plentiful sweat, and relieved the affections of the breast and fever in the course of a few days.

The sweating continuing reduced her so much, that it was thought advisable to give the bark to check it; the saline julep, with laudanum, was occasionally given, to
relieve

relieve the irritation of the breast, and to procure sleep. She continued gradually to recover for about ten days. The pain in her breast and side returned, which was removed again by the sweating being produced, which left her in a more reduced state than before. The Angustura bark checked the sweating : but within fourteen days the whole train of unfavourable symptoms again returned, with troublesome aching pain in the extremities ; and was again removed by sweating. In a little time was able to go down stairs, and in fine weather to ride out in an open chaise ; but seldom more than a mile at a time, which seemed to be attended with advantage. Yet, nearly about the same distance of time, i. e. about fourteen days, she was attacked with all the unfavourable symptoms before mentioned. The Angustura bark was then changed for a decoction of the yellow bark, two spoonsful twice a day, and the following.

1st night. Pain in the breast, and side, and back ; sweat much in the night ; in the day very languid, with frequent giddiness in the head ; often faint and sick ; took very little nourishment ; pulse 70 ; very weak ; had but little sleep for three nights.

Took, at going to bed, one quart of hydro-carbonate air, with resting three times ; complains of a slight giddiness in her head.

2d. Had a better night ; was faint and sick ; in the morning was able to ride about two miles in an open chaise ; was better of her sickness, the pain in her breast and side easier ; had not sweat so much the night before ; pulse regular ; took one quart of the hydro-carbonate air, with resting twice, and did not complain of any affection of the head.

3d.

3d. Slept tolerably well in the night, without any sweating ; was rather faint when she awoke in the morning, with a slight giddiness of her head ; rode out about three miles ; the affection of her head better, the pain in her side worse ; appetite better for her dinner ; in the evening the pain in her side was better, and had been free from pain in her breast all the day ; took in the evening three half-pints of hydro-carbonate air at three times, which affected her head very much ; was not able to take more ; the pulse was about 100, and did not seem to be altered from the affection of the head by the air.

4th. Slept better ; the pain in the side continued, the pain at her breast better ; did not sweat in the night ; appetite better ; pulse 80 ; complained of heat in her hands and feet frequently, with giddiness in her head for the course of the day ; rode out about four miles ; the affection of her head better ; took three pints of the hydro-carbonate, which affected her head a little ; took it at three times.

5th. Slept tolerably well ; no sweating ; the pain in her breast and side better ; pulse 100 ; frequent flushings of heat in her hands and feet, and a little giddiness in the head ; rode out, and the affection of the head was better ; took three pints of the air at three times.

6th. Rested well ; the pain in her breast and side better ; sweating entirely gone off ; appetite better.

7th. In every respect from this time continued gradually recovering, and had not any return of the complaints ; continued the use of the air for two months, and is at present better than for twelve months past.

20 Sept. 1796.

CASE XXV.

Accidental Cure of Consumption.

SIR,

I TAKE the liberty to inclose you a newspaper, containing an account of the nitric acid* on the human body; for, to whom can I address myself so properly on such a subject?

I am the author of this account, and I believe it is nearly a representation of the truth. It may tend, I think, a little to advance our knowledge of the nature of some diseases; and may perhaps lead to the introduction of a powerful agent for their cure. You may make any use of my name that you think is right in this matter: my name, I fear, is too little known to give it much authority. Another paper will soon appear on the same subject, in which I mean to take notice of some other effects of the nitric acid; 2dly, to describe some attempts that I have made to get a substitute for it; and lastly, my method of procuring the acid best fitted for internal use. This acid I procure by mixing three parts of uncalcined alum, with one part of nitre, and distilling by the usual method.

I have lately met with a case that is a confirmation of your opinion regarding the phthisis pulmonalis, and its method of cure. A lieutenant in the Bombay marine was lately, at Bengal, so ill of a complaint which every body believed to be a consumption, that for a long time he

was

* See the Appendix.

was incapable of doing his duty, and given over as incurable. In this hopeless situation it became necessary to him to proceed to Bombay. During the passage the bilge water of the ship got at some sugar with which she was laden; which, from its decomposition, was supposed to have injured very much the purity of the air. Below decks the air certainly became very impure; which at first induced this gentleman to remain above: but he one day, on going down below, observed that his respiration went on much more easily than on deck. He soon fell into a sound sleep in this new situation; and from that time he remained below in this atmosphere, from which he continued to feel relief. His health afterwards daily improved; and he is at this moment in good health, and doing his duty at sea.

I remain, Sir, &c.

W. SCOTT.

Bombay, May 4, 1796.

REMARKS

Remarks on the effect of a dose of Hydrocarbonate Air, by
Mr. GREENWOOD.

WEDNESDAY, the 5th of October, at three o'clock, inhaled four quarts of diluted hydro-carbonate air; about ten minutes afterwards, not having moved from the chair where I received it, I felt a numbness in my forehead, and a sense of weight or heaviness in the eyelids. This was succeeded by a dizziness, accompanied with an uncommon faintness, as if the stomach and belly were an entire vacuum.

There happened to be within my reach a small quantity of spiced wine. Of this I drank twice after the faintness came on. It caused a temporary relief. I then twice attempted to reach a sofa, less than two yards distant; but, on rising from the chair, found myself in danger of falling on the floor from extreme giddiness. On this, I fixed myself as firm as possible in the chair; sitting sideways, with one leg to the front; and my forehead rested in the bend of my arm on the back of the chair. In this situation I lost all sensation; how long I cannot tell. During the state of insensibility there was an involuntary discharge of urine. On recovery, felt great languor: therefore remained a few minutes in the chair. My sisters at that time came into the room, and, as they afterwards informed me, were alarmed at seeing my face quite pale, and lips blue. They hastened to me, and caught me; for at that instant I fainted. The remaining part of the day I was languid and weak: the

Q

night

night full as good as usual : the expectoration less copious. Next day, what difference there was, was for the better ; and nothing disagreeable afterwards followed.

I must remark, that on Wednesday, the 21st of September, I had begun to take four quarts of hydro-carbonate air, equally diluted, three times a day ; and that on Monday and Tuesday, (the 29th and 30th) I took five quarts twice a day. Prior to that, I had been taking from two pints gradually up to five quarts, without much *sensible* effect. After this alarm, it was enquired, whether the air was recent or not. The man who administered it, was positive it was air of several days standing ; but, as he had brought an airholder of fresh hydro-carbonate, with intention to take away another that was full, what I took might have been new made. An attempt was not made to ascertain the fact till my physician came ; and then, on account of the change of the airholders, no fact appeared, either to confirm the assertion of the man, or otherwise.

Oct. 13, 1796.

JOHN GREENWOOD.

REMARKS

REMARKS

ON THE

PRECEDING CASES,

BY

THE EDITOR.

ELIMAR

ELIMAR

ELIMAR

REMARKS.

AMONG the preceding cases, that of Newbury (Case XXI) deserves to be distinguished. Mr. Watt, who exhibited the hydro-carbonate,* Dr. Carmichael, and Mr. Barr (as I learned from their conversation) were much struck by its effect in lowering the pulse, and mitigating the very alarming symptoms that attended the discharge of blood. I applied to Dr. Carmichael for more minute particulars respecting the pulse. His answer was as follows; “ I find it impossible to make you any satisfactory return to your enquiry respecting Newbury’s pulse, further than, that the first time he inhaled the diluted hydro-carbonate, it was rendered slower by ten pulsations in a minute. I give you this on the authority

*. Mr. Watt informed me, that this gas was prepared from one part in bulk of cast-iron borings, and three of charcoal. It was so strong, that, when fresh made, N. could not bear above a quart at a dose.— Mr. Watt’s queries on this case were, 1st. Could the iron do any thing? 2. Does not the case furnish a hint, that copious eruptions upon the legs would be of use? 3. And might they not be produced by frictions with flour of mustard, cowhage, &c.? The editor had this year a consumptive patient, on whose body a copious progeny of boils broke out in long-continued successions, but without any change in the symptoms.

Mr. Watt, in a letter, dated Aug. 17, 1796, informed me, that Mr. Barr counted Newbury’s pulse in the first fever fit, and made it 100; and that it fell to 90 “ *during the time he was taking the first pint of hydro-carbonate.* The second, or threshing fever, I could not count it; but suppose it to have been at least 120, and strong! In about three days it was got nearly natural, and the eruption appeared. In the interim, he had three pints of hydro-carbonate twice a day.”

thority of Mr. Barr, who happened to be present at the first trial. I never saw him sooner than twelve or fifteen hours after the inhalation, otherwise should have particularly specified the quantity and quality of the pulsations."

In cases like this I should advise hydro-carbonate air with considerable expectation of advantage. But we shall not soon have a sufficient number of facts to determine its virtues; as considerable hæmorrhage from the lungs, with strong pulse, is a disease rather unfrequent: and it is still more uncommon for a physician to be called in, till ulceration of the lungs, the formation of new vessels, or the power of habit, has altered the nature of the complaint.

In the case of the late Mr. Gray, editor of the Morning Chronicle, whose fortitude under his sufferings I had an opportunity of admiring during the last week of his life, I made a singular observation. After various other complaints, he had been for several weeks subject to occasional pulmonary hæmorrhage, and to almost constant hæmoptoe. One morning I was hastily called to him, and arrived before he had discharged from his mouth the last of about a pound of blood. On taking the basin from his hand, I saw that the coagulated masses, which were numerous, had taken a ramified or digitated form. The branches were of various diameters, from a crow-quill to a hair. On washing, I perceived that the coagulated lymph had enclosed numerous air-bubbles, and some red particles. The appearance of air-bubbles was perfectly distinct. Dr. Crau-
furd,

furd, of Bristol Hotwells, to whom I shewed the coagula, perceived them perfectly. The air-bubbles, and the fineness of some of the fibres, prove that the blood coagulated almost instantaneously after its effusion into the air-cells. I do not see that the fact suggests any useful conclusion. But the propriety of recording unusual phenomena, when they can be completely ascertained, is acknowledged.

On the foregoing cases of consumption, in which hydro-carbonate was used along with powerful drugs, it is obvious to remark, that the drugs would not of themselves have produced the effect. Should the favourable event, as it reasonably may, occasion scruples respecting the real nature of the complaint, it is to be observed, that, in general, the account of the symptoms is very precise, and the expressions very pointed. A perfectly impartial practitioner, for instance, says, that he does not think it "possible phthisis pulmonalis could be more strongly marked than in W. Roberts."

From such reports, I infer only, that it may be proper *cautiously* to administer hydro-carbonate, or other factitious unrespirable air in consumption, two, three, or four times a day, till either some remedy of a different nature be discovered, or some better method of employing these substances be rendered practicable. I procured Mr. Greenwood's observation on himself to enforce caution. The relaxation of the *sphincter vesicae*, and the universal resolution of the muscles, seem to confirm what has been suggested concerning the probable utility of hydro-carbonate in strangulated hernia. It ought also to be tried in tetanus. If advantage be taken of these

these accidents, I doubt not but the trouble of the present investigation will be compensated by collateral benefits, though the original purpose should not be attained. The only other example of a disagreeable effect produced upon a patient of my own, that has ever occurred to me from this class of airs, is the following. A person, far advanced in consumption, had his hydro-carbonate increased from one pint to two quarts. He took two quarts in the morning in bed without any unpleasant feelings. He took two quarts in the evening, also in bed ; and, after sleeping about twenty minutes, awaked with a violent head-ache, succeeded by some delirium. His hectic fever ran higher than usual in the night : it was aggravated, I suppose, by the head-ache, which was doubtless owing to the hydro-carbonate. Next day, he was very little worse than usual, and afterwards better. The air was the same morning and evening.

I have occasionally seen good sleep from very moderate doses of hydro-carbonate. Miss S. daughter of Dr. S. constitutionally very feeble, and in the last stage of consumption, after taking a quart of hydro-carbonate, could sleep sixteen hours out of the twenty-four without medicine. She felt no head-ache or other inconvenience. This effect continued, with some abatement, for a week ; when she went from the Hotwells. I have lately received an account of the similar operation of an over dose of hydro-carbonate. " A woman, aged —, had been afflicted with a cancerous ulcer for more than ten years, the pain of which deprived her of sleep almost completely ; at least her sleep was neither sound nor refreshing. She was treated with oxygene, which had some
good

good effects. *I believe*, hydro-carbonate was also tried, of which, accidentally, she got one day a large dose, which brought on syncope and deliquium, which lasted a considerable time. When she recovered, she was put to bed, and slept sound many hours. Next day she said she had been in paradise, and that all the sleep she had had for ten years put together, did not amount to so much as she had had this last night, and the pain of the cancer continued easier throughout that day. The event of the case I have not been informed of, but believe there was no cure."

Continued reflection, and information from various quarters, lead me still to expect, that we shall arrive at a method of treating consumption successfully. All the great attempts, in which human genius has succeeded, were taxed beforehand as presumptuous follies. *Le vulgaire de chaque siecle cite avec emphase le PASSE contre L'AVENIR : celui qui succede le voit dementi par l'evenement ; mais en insultant a son erreur il l'imite, et deplaçant seulement ses negations, il n'en poursuit pas moins infatigablement ses proscriptions prophetiques.*

If, on the one hand, we need not be thrown into despair by the *anticipations* of prophets, not critically versed in the present and the past ; we may, on the other, discover grounds for hope, without placing any reliance on speculation ; for, in consequence of being placed in uncommon situations, some consumptive patients appear clearly to have recovered. Mr. Scott's communication is an example of this kind. — In many countries *cow's breath* is a traditionary remedy ; and patients may occasionally have been indebted to it

for a respite from their fate. Dr. R. Pearson, of Birmingham, produced from Dr. Bergius one instance, in which a lady, in the last stage of consumption, had her distressing symptoms all removed, from living the winter in a room with four cows. In September she had cough, expectoration, complete hectic fever and swelled feet. She experienced gradual amendment. By Christmas her pulse had become natural. In summer she gained flesh; the catamenia returned; she had only a slight cough, and breathed quickly when she walked. The next winter she refused to pass her nights with cows. In spring she caught cold, and was again phthical; in autumn she persisted in refusing to return to her first plan, and died at the end of winter. Far advanced consumption, in ordinary circumstances, never observes such a course; nor is there any known medicine capable of removing hectic fever, cough, and expectoration, accompanied with œdema and diarrhoea for a week, much less for two winters and a summer. Lately, while I was preparing to repeat this interesting experiment, I obtained the following communications.

Clifton, Oct. 17, 1796.

DEAR SIR,

UPON your mentioning to me that you were about to try the effect of the breath of cows in consumption, it occurred to me that I could procure you the case of a French Lady, with whom I have the honour to be well acquainted, which proves that the experiment has been successful. She consents to its being made public; and
gives

gives you leave to refer any persons to her, who may be really interested in procuring further information on the subject.

I am, dear Sir,

Your's very sincerely,

J. HARE.

To Dr. Beddoes.

APRES une fausse couche de trois mois, pendant laquelle je me suis fort peu soignée, et dont il m'étoit restée une perte de sang considérable pendant plusieurs semaines ; j'ai tombé *en consommation*. Cela a commencé par une petite toux sèche avec une fièvre légère, et que je négligeois ; continuant toujours de sortir : de me coucher tard ; et *en tout* de vivre d'une manière trop active et trop agitée pour la situation de ma santé : qui de jour en jour devenoit trop mauvaise. Enfin je crachois le sang mêlé de matière purulente ; mes jambes s'enfioient, et mes *epoques* étoient quasi tout-à-fait disparues, et le peu qui en paroissent étoit de la plus mauvaise *espèce*. Je ne dormois plus, et étant aussi mal qu'on peut l'être, alors plusieurs consultations des premiers médecins de Paris avoient lieu ; et il en resultoit qu'ils regardoient le mal comme trop avancé pour pouvoir espérer me guérir. Ils ordonnoient le lait d'anesse et l'exercice à cheval, ce qu'alors je n'étois plus assez forte pour entreprendre. J'avois 19 ans, et je sentoais ma fin arriver avec beaucoup de chagrin. Dans le tems que je me pleurois, je recevois la visite d'un ami à moi M. le Marquis de Voyez d'Argençon, homme de beaucoup d'esprit : qui tout en s'affligeant avec moi, me dit, prenez mon conseil ; puisque toute la faculté vous abandonne,

abandonne, laissés moi vous amener un homme, qu'on traite ici de charlatan, parcequ'il n'est pas connu ; mais qui dans mon opinion est un homme de mérite. Il me l'amena. Je crachois le sang par lambeaux, et j'avois une fièvre si forte et une douleur si profonde, que je lui tendois les bras, en lui disant : Ah ! s'il en est encore tems, *sauves moi*. Il me promettoit de faire tout ce qu'il dependroit de lui : mais je l'entendois dire *tout bas* qu'il étoit bien tard, ce qui ne diminua pas ma fièvre. Il me fit jurer de faire tout ce qu'il voudroit, quelques souffrances que je dusse éprouver. Je l'affurai d'une parfait obéissance, et je lui ai tenu parole. Il m'e mit malgré ma fièvre dans un bain tied, tout près de mon lit. J'y restai trois quarts d'heure ; ce qui me calma beaucoup : on me remit dans mon lit beaucoup plus tranquille, et j'eus quelques heures de sommeil, qui me persuaderent que j'étois déjà beaucoup mieux. Le lendemain matin il m'appliqua sur la poitrine un vésicatoire de six pouces de long par quatre de large, qui me fit beaucoup souffrir et eut fort peu d'effet. Mon excessive maigreur le rendant beaucoup plus douloureux, il le changea et le plaça entre mes deux épaules on je l'ai eu 4 mois. Ne trouvant pas qu'il en eut l'effet désiré, il m'ordonna l'habitation d'une étable avec *trois vaches* ; ce qui fut exécuté en moins de 24 heures dans une remise à voiture appartenante à ma maison. On perça une fenêtre et on y construisit un atelier pour 3 vaches. Une ballustrade en bois à hauteur d'appui étoit tout ce qui me séparoit des vaches : mon lit étoit placé sur un plancher à un pied de terre pour laisser couler dessous les immondices. Il étoit de planches qui joignoient fort mal afin que la vapeur fut plus forte : et elle l'étoit *à tel point* que tout ce qu'on portoit de blanc devenoit rouge-
atre

atre dans fort peu de tems. . Mon logement dans la longueur de la remise étoit séparé en deux pièces ; celle que j'habitois *affes grande*, dans laquelle étoit *un lit* sans rideaux, entouré d'une coussiniere *de gaze*, comme celles dont on se sert en Italie pour le meme effet, qui est de se preserver des mouchés, qui sont toujours nombreuses dans les etables et insupportables surtout quand on souffre. Une table de bois ; deux chaises de paille sans coussins, les simples murailles ; voila quelle étoit ma chambre. Elle étoit precedée d'une petite pour la femme qui soignoit mes vaches. Mon chirurgien et ma femme de chambre logeoient au dessus de mes remises. Il y avoient dans mon lit deux sonnettes differentes pour les avoir à volonté. Là j'ai reste *neuf mois sans relache*, à l'exception de quelques promenades dans ma voiture entourée d'oreillers, et les chevaux n'allant qu'au pas sur le pavé a cause des secouffes que me faisoient souffrir le martyre. J'oublois de dire que mes vesicatoires, n'ont jamais rendu de *matiere* que dans *l'etable*, mais qu'il falloit pour les entretenir et les conserver, les ranimer tous les deux ou trois jours dans le commencement. Ce qui m'affoiblissoit beaucoup, mais l'espoir de guerir rélevoit mon courage, deja je crachois moins de sang, ensuite les crachats n'étoient que *teints*, après la matiere devenoit tous les jours moins epaisse. Les jambes ont cessé de s'enflér après 8 jours d'etable. *Le premier mois* a paru regulierement mais en petite quantité, le second un peu plus *abondant*, et de mieux en mieux *tous les autres*. Des l'instant que je suis entrée dans mon etable, j'ai quitté tout espece d'aliment autre que du lait. Celui d'anesse à 5 heures du matin ; qu'auparavant j'étois obligé de couper avec de l'eau de Seltz pour le faire passer ; et qui dans l'etable passoit sans aucune *aide*.

On

On m'apportoit à respirer, *matin et soir*, la jarre de lait frais qu'on venoit de tirer des vaches. Toute la journée j'*en buvois*, et le soir je prenois ordinairement du ris au lait bien crême et bien cuit ; *rien autre chose*. Je n'ai jamais goûté meme *le pain* pendant neuf mois, j'avois le bonheur de ne rien desirer. On venoit me voir comme objet de curiosité, et on me trouvoit si changé, qu'on croioit que c'étoit fait de moi. Madame la Duchesse d'Orleans. est venu me voir, et apres ma guerison, c'est elle qui a recommandé au Duc, le Dr. Saiffert, ce qui lui a fait faire sa fortune. Du moment que j'ai été retablie. tout le monde a voulu l'avoir, et generalement on s'en est bien trouve. Mais je dois dire quel soins il me rendoit. Tous mes pansements se faisoient par lui, on sous ses yeux : il me visitoit quatre et cinq fois par jour, pour me consoler et m'engager a souffrir avec patience : enfin il m'a sauvé, et je n'ai perdu a cela, que mes cheveux, qui tomboient tous, et qu'il m'a fait raser. L'obligation de me faire reparer mes dents de devant, que pendant mes souffrances j'avois negligé, et la defense absolue de plus jouer de la harpe : d'avoir conservée la respiration fort courte. Mais qu'est ce que tout cela en comparaison de la vie ? J'étois plusieurs mois a refaire mon estomac aux aliments ordinaires ; et c'est avec de la chou croute préparé et bien simplement pour mon diner ; et un peu de Chinchina dans du vin le soir, et de la teriacque de Venise, qui je suis parvenue a le retablir parfaitement. Mes nerfs ont été irrités bien long tems ; mais tout cela s'est passé en moins d'une année, et je suis devenue une femme tres forte. Les deux grandes recommandations de mon medecin apres ma guerison *etoient* ; évitez la saignée et les rheums ; ce que j'ai fait le plus possible ; mais ce climat est humide, et
malgré

malgré mes precautions, j'ai été assujettie à plusieurs, au moment ou j'écris ceci j'en ai une tres fort, avec un vesicatoire sur la poitrine. Aujourd'hui j'ai trente-six ans. Je suis moins forte qu'à 19, et malgré cela je me tirerai d'affaire. Des calmants ; du lait d'aneffe ; une vesicatoire qu'il ne faut pas trop forcer parceque cela irrite : point de vin ni de thé ; beaucoup d'eau d'orge coupé avec du lait un œuf, frais *au jour* pris à jeun ; l'exercice du cheval en bon air. Je suis bien convancue qu'avec ce regime la, on se tirera toujours d'affaire : quand la toux est forte il faut toujours humecter. Une gorgée d'eau d'orge suffit : cela n'empate pas comme tous le syrops et je m'en suis toujours bien trouvé. Il ne faut pas negliger dans la preparation des vesicatoires de mettre beaucoup de camphre et d'opium, afin qu'ils irritent aussi peu que possible.

In answer to questions proposed by the editor, the same lady wrote :

Pour repondre aux questions de votre ami Docteur B. je puis l'assurer que j'avois des sueurs presque toutes les nuits, et des frissons plus on moins legers suivis de chaleurs plus on moins fortes, que j'ai conservé assés longtemps dans mon etable, et dont je ne me suis debarrassée que par le succès de ma vesicatoire.

It may be asked why, after so brilliant a cure, the same method was not further prosecuted at Paris ; and the knowledge of its efficacy, if it proved effectual, spread over Europe. They, who have that knowledge of human nature which the practice of medicine confers, will be sensible of the difficulties attending such an undertaking.

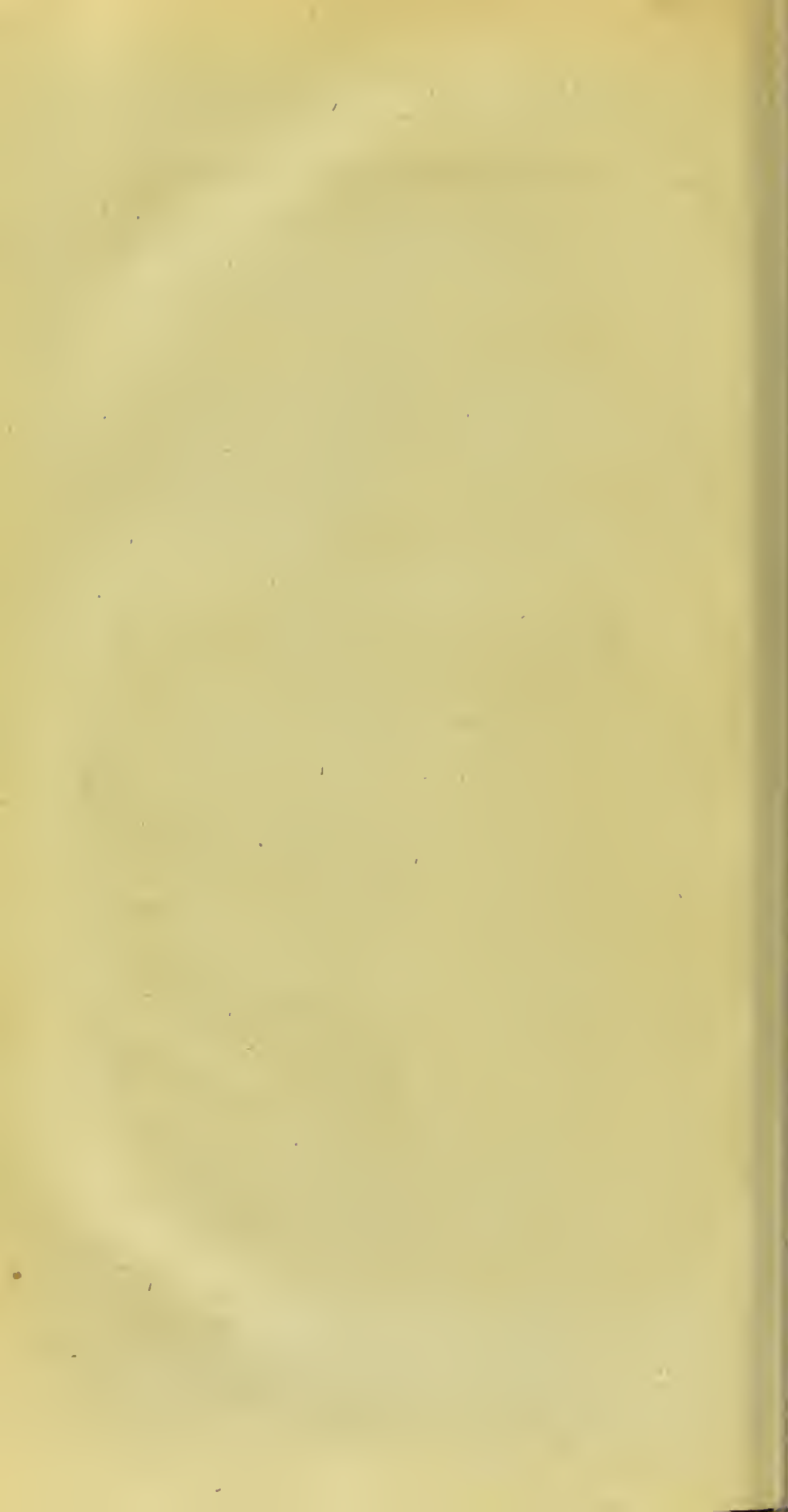
undertaking. For myself, I doubt not of being able to overcome them finally : but I have oftener than once been defeated by external circumstances, when the patient, and the patient's friends, were desirous that the trial should be made.

I should make a number of observations upon the French narrative ; if it were not prudent to ascertain facts, before their analysis is attempted. I think it probable that the cow's breath was not essential to the cure. The patients, both in Sweden and France, were exposed to various vapours arising from animal substances, as they underwent chemical changes : and I suppose that the constant action of some of these gave the pulmonary ulcers a disposition to heal. If this supposition were true, nothing would be more easy than to imitate the experiment without the trouble and expence of the cows. The equal temperature, kept up by these animals, might have been an advantage.

MISCELLANEOUS

MISCELLANEOUS CASES.

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MISCELLANEOUS CASES.

CASE XXV.

Of Dyspepsia.

MARY HODDER, aged 39, lives a servant to Mrs. Godfrey, No. 74, Piccadilly; has for seven years laboured under sickness at the stomach, frequent retchings, great heat and pain at the pit of the stomach, and flushings of the face after eating; drowsiness, a briny water would often flow into the mouth, emaciation, great debility, horrid dreams, often waking in excessive fright, and commonly with a dull head-ache. She would faint away after any uneasiness and fatigue, and remain for five or ten minutes like a dead person; feet and legs extremely cold, subject to flatulence, extremely costive, sight impaired; and, on account of her ill health, she was obliged to leave three places. She was turned out uncured twice from the Hospital, and once from a Dispensary; and had tried private practitioners without benefit. Of late the symptoms of her disorder had rather increased; when she began the inhalation of the vital air. In three weeks, by the power of this remedy, conjoined with emetics, cathartics, bark, and steel, she became perfectly free from sickness, appetite returned, sleep was undisturbed

undisturbed by frightful dreams, perspiration restored, a genial glow in the extremities, countenance became healthy, and strength so far increased, that she feels herself perfectly adequate to her present situation. The air has been left off, and the amendment continues. The quantity of air inhaled daily, was six quarts of vital air to thirty of atmospheric air.



CASE XXVI.

Corpulency, accompanied with Dyspepsia.

Mr. ASKINS, a smith by trade, married, aged 36, was always inclined to corpulency, latterly has become bloated, has frequent heartburn, disturbed sleep, flatulency, no appetite, lethargic, costive, with depression of spirits, and an inability to work; which however he endeavours to accomplish for the support of his family, sitting up to a very late hour. This disorder has been increasing on him for three years past. He had been under Dr. Duvallengin's care for six weeks, and had lately tried bark, myrrh, and steel, for a month; but the symptoms continued nearly as before. His complexion was exceedingly fallow; and in coming to me from his house, No. 48, in the Old Bailey, he was at first above an hour and a half; owing to his being exceedingly short-winded, if I may be permitted to use his own expression. All these symptoms appeared to me to denote a deficiency of oxygene in the blood, or a state of scurvy. Having therefore premised an emetic and calomel cathartic, which brought away a great quantity
of

of flime, I ordered him a solution of nitre in vinegar, which produced all the good effects so accurately described by Mr. Patterfon in his treatise on the sea scurvy; and in a fortnight he came to return me thanks for his cure, with such an altered appearance, that it could not fail to strike every one present; and he had walked to me in less than twenty minutes.

Observations on this case by Dr. THORNTON.

I. As the nitrous vinegar reddens immediately the black blood out of the body, may we not thence argue, it probably produces the same effect in the body; and does not this case tend much to confirm this opinion?

II. I am trying this remedy in asthma, chlorosis, putrid fever, the secondary stage of the small pox, a most deplorable case of leprosy; and, from my short experience with this new power, first suggested by your theory of disease, it seems to promise to be an useful article in the materia medica.

III. The prescription I usually give, is two drachms of nitre to seven ounces of distilled vinegar; two table-spoonsful of which is to be taken every six hours, as the bowels may permit.

CASE XXVII.

Nervous Head-ache.

In March, 1793, Mr. Monier, who lives at Mr. Higgins's, No. 38, Southampton-street, Covent-garden, applied to me for a violent nervous head-ache, accompanied with stupor, and frequent giddiness; which nearly incapacitated him from all business, and had continued unremittingly for above six weeks. His countenance was pallid; his eyes devoid of spirit; his feet cold; his pulse scarcely sixty; his rest bad; he had no appetite; or, in one word, to use his own expression, the head-ache had wholly *unmanned* him. I ordered him an aperient draught; and then administered the vital air in a state of much dilution; and in a week he was restored to perfect health, in which state he has ever since continued; having had since not even the slightest indisposition.

Observations on this case by Dr. THORNTON.

I. After inebriation we observe symptoms very similar to those I have above described. Hence the adage, "It is a pleasant thing to get drunk, but very unpleasant the getting sober again."

II. As the going out into the open air frequently gives relief under such circumstances, was not the vital air indicated in Mr. Monier's case? The event seems to prove the propriety of the trial.

III. Then was no pulsation of the temporal arteries, or signs of plethora; where these appear, should we not caution against the application of this remedy?

CASE

CASE XXVIII.

Fever.

DEAR SIR,

IT seems reserved for the honour of the present enlightened age, to discover a scientific and successful method of treating putrid fever. The contagion has been represented as a stimulus exhausting the irritability of the system, which depends upon the oxygene in the blood; and a method of cure hypothetically deduced was to supply this as fast as it was consumed by the excessive and morbid stimulus. You justly reprobate the common practice of drenching patients labouring under typhus, with wine and opiates, until they are not unfrequently stimulated to death. "If I have imputed the debility," you say, "to its real cause, our chief aim should be to restore the principle of excitability; and stimulants should in the mean time be exhibited with a more sparing hand." Under this persuasion I have conducted my practice, and with what success the present case will disclose. John Lewis, chairman, living at No. 42, Compton-street, was seized with head-ache; rigors, terminating in violent sweat; great thirst; a very unpleasant taste in his mouth; delirium at night; a sense of burning in the region of the stomach; spirits exceedingly depressed; so weak as to feel his legs sink under him; his countenance is extremely vacant; his answers are incoherent; he complains of incipient deafness; being desired to put out his tongue, it appeared coated, and very brown; and there was a crackling noise in respiration; the pulse is feeble, tense, and very quick.

In

In order to diminish the excitement, and also with the view to dislodge the morbid stimulus, I directed an emetic, to be succeeded by a cathartic. The former was repeated twice; the latter every night. To impart oxygen to the blood, which was consuming by the excess of morbid stimulus, I made him inhale each day ten quarts of vital air to thirty of atmospheric; and besides oxyd emetics and aperients, I gave him nitre; adding a little bark and myrrh to keep up his strength. From my journal it appears, that he progressively grew better, and in a fortnight was restored, all except his deafness; when, by my advice, he went into the country. In another case I combined the acetum nitrorum with the happiest effect.

I am, &c.

R. J. THORNTON.

Observations on this case by Dr. THORNTON.

I. Has not typhus, or putrid fever, commonly two stages, in which the blood exhibits opposite characters.

II. Does not the similar appearance of the blood in the secondary stage, as in sea-scurvy, indicate the same deficiency of vital air in the blood?

III. Does not the contagion pass by the saliva into the stomach and bowels, and there produce its first action?

1. Upon dissection Dr. Crawford discovered, that the intestinal canal was coated with a thick mucus, often obstructing the gall duct.

2.

2. Diarrhœa has prevented the access of this fever; and in the forming stage, an emetic or two, with cathartics, has, from concurring testimony, seldom failed to cut it short.

3. When resident two years in Guy's Hospital, besides my attendance with the class in the morning, being every day two hours after dinner in the hospital, I stood a peculiar hazard of taking this infectious fever; and I am inclined to attribute my escape to my not swallowing the saliva at those times;



CASE XXVIII.

Ague.

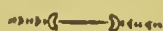
September 10. SAMUEL SMITH, recommended to my attention by Mr. Adams, optician, Fleet-street, has had an ague above a twelvemonth, caught in working for Lady Dunlop, Hadley-Hall, Essex. At first it came on him every third day for a month; the next month every other day; and then three times a day for a short time; after which it settled in a third day ague. Pounds of bark, bark and steel, and a variety of nostrums, had been tried to no purpose. His skin was yellow, his appetite gone, he had great debility, used frequently to faint away, and was, on his well days, nearly incapacitated from work. Having given him the vital air, eight quarts to thirty of atmospheric for two days, he had a slight attack on the third. The air was continued,

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and

and the next attack was still lighter, complexion cleared, appetite improved; and the recurrence of the paroxysm was prevented. Having persisted in the air nearly a month, he was perfectly cured.

R. J. THORNTON



CASE XXIX.

Eruption on the Arms.

ELIZABETH FRANKLIN, aged 19, naturally of a very strong constitution; with that want of prudence so frequently observed with those who trust too much to this circumstance, after a hard day's labour, being very dry and hot, drank a large quantity of cold water; which immediately produced so violent an head-ache, that she was obliged to go to bed. The next day there appeared an efflorescence on the skin, which soon ended in a scurfy eruption on the arms. It had progressively increased; it is now five years; and at length incapacitated her from service, and she became a burthen on her family. She had been under Mr. Dundas's care at Richmond eleven months, but without benefit; having before tried a variety of remedies. Observing the great amendment of her neighbour, Richard Major, whose case I have before related, she was induced to apply to me. I ordered her a lotion of nitre and vinegar, which Mr. Patterson, conducted by your observations upon sea-scurvy, found to be a specific in that disease. I gave her vital air to inhale, as a purifier of the blood, in the proportion of six quarts to thirty of atmospheric; and I
diffused

diffused a greater energy of circulation in the capillary vessels by means of myrrh, bark, and steel, having first cleared the *prima viæ*. The effect of the *acetum nitro-rum*, or solution of vinegar in the nitrous acid, was the encreasing the eruption, occasioning acute pain, and rendering the parts very florid. It was however persisted in, and, after a fortnight, the benefit from this application became very conspicuous. The vital air, at the time of inhalation, always diffused a glow, encreased the number of the pulse, and produced perspiration. The other remedies tended to keep up this effect; and, after a month, the arms, which before bled upon the least pressure, were in a fit state to bear the flesh brush, which has been ordered; and the surface, after six weeks, only shews the great extent and malignity of the former afflicting disorder; and the young woman is restored as an useful member to the community, being now fit for washing, and other services.

R. J. THORNTON.



CASE XXX.

Case of Eruption.

Mrs. WILKINSON, who lives in Dartmouth-street, Westminster, had for fifteen years a *scorbutic humour* in the legs, corroding into sores the muscular parts, which *scurfed*, and occasioned frequent and violent pain, and an almost total incapacity for exercise. The muscles of the calf were hard, and of the colour of mahogany. A great variety of remedies had been tried, as water-dock,

dock, elm bark, sulphur, &c. and this lady, by the advice of Dr. Haighton, physician of the Eastern Dispensary, had taken for the last four months bark and lime water. As Dr. Haighton thought her disease depended wholly upon the constitution, and there was no need of any local application different from what Mrs. Wilkinson was in the daily habit of applying, I was happy to employ upon this occasion the vital air. This lady, after a week, felt violent itching and pain in the legs; the colour of the parts was visibly improved; and the ulcers exhibited marks of active inflammation. In a few days after this, the wounds, which were ten in number, instead of a thin acrid discharge, threw out pus, and the edges in many were diminished. The hardened muscles not long after became soft. The other beneficial effects of the vital air, as far as regards appetite, spirits, warmth, sleep, &c. were the same as those which are so energetically described by the Rev. Mr. Atwood, in his invaluable Journal. In six weeks only Mrs. Wilkinson could use the flesh brush to both legs; and the last account I have of this lady is, that she was able to walk from Ramsgate to Margate, five miles, without a sense of pain in the legs, or even fatigue. I shall hope to send, at some future time, the sequel of this interesting case; and shall beg leave now to observe, that the leg of Patterson, which had for two years thirty holes in it, and was healed by the inhalation of a super-oxygenated air, has continued perfectly sound, it is now above eighteen months; which leads me to the hope, that a permanent benefit will be also derived to this lady.

R. J. THORNTON.

CASE

CASE XXXI.

*August 23, 1796.**Bennet-street, St. James.*

DEAR SIR,

JANE FINLAYSON, aged 7, living at No. 4, Lannier-street, Bloomsbury, had the small pox five years ago ; since which period she has been afflicted with a dreadful scorbutic humour, covering both legs, the shoulders, and the arms ; which either encrusted, forming scales, or oozed out a thin, serous discharge, discolouring the linen. She would often awake in the night ; when, probably from extreme itching, she would tear the humour, converting it to a sight truly terrific and disgusting. This she would sometimes do, even in the day. Her mother first applied to the Gerrard-street Dispensary ; and she took pills and aperient powders for six weeks, under the care of Dr. Jackson, without benefit. Her mother then took her to Mrs. Spillbury, and she continued taking her drops for nine months ; but this boasted acid was equally ineffectual. She now went into St. George's Hospital, and fell under the care of Mr Keate ; who employed the unguentum hydrargyri nitrati outwardly, with mercurial pills every night, and an aperient powder every third morning ; and these were persisted in for three months ; but they produced only a slight degree of benefit, and in a few days after she was taken from the Hospital, the disease broke out as bad as ever. Her mother then, from a very prevalent opinion, judged her only hope was from her breathing her native air, and she accordingly took her over to
Ireland ;

Ireland ; but neither the journey, voyage, or native air, proving of service, she applied to Dr. Frazier, of Dublin, under whose care she continued six months. He employed tar ointment, and a lotion chiefly consisting of a weak lime water : but, as the case seemed to defy all art, the mother thought fit to return with her child, rather worse, than mended, seven months ago. Mr. Ogle, an apothecary in Great Russel-street, at this time refused to do any thing for her, telling her mother, “ he could not be of any service, and it was best to leave her disorder to nature.” This was the candid opinion of some other gentlemen of the faculty ; except that one recommended tar ointment, and it was resumed. The disorder however getting a head, the poor child was for six weeks wholly incapacitated from using the slightest exercise ; not being able to stand upon her legs, the humour had spread so around the knees. She was therefore brought to me in arms, and she inhaled immediately six quarts of vital air mixed with twenty of common air ; and such is the fact, *in two days’ time*, she was able to walk here, above a mile and a half ; her spirits were elated ; her complexion was cleared ; the wounds had thrown off large scales, shewing a glossy red skin underneath ; in a week the progress was such, that some large patches had already disappeared ;—in a fortnight the humour on the legs and thighs was in many places hardened, and had scurfed off ;—and in three weeks, on the back and arms there remained only the signs of previous disease ;—and it is now twenty days, and the legs, thighs, the back, and arms, shew a truly natural and healthy appearance. The girl took all this time three or four doses of aperients, and *no other medicine*.

From, dear Sir, your’s ever,

To Dr. Beddoes.

R. J. THORNTON.

DEAR SIR,

Basinghall-street,

Sep. 16, 1796.

Mrs. Finlayson called upon me yesterday with her little girl, and brought me your letter. My recollection does not enable me, having seen the child but once, to contrast minutely the former appearance of the eruption with the subjacent parts that are now exhibited. I am satisfied, however, that there is a material alteration for the better. The inflammation, I see, has entirely subsided; there is no longer any ferous discharge, which, the mother says, was at one time very abundant; and, though there is still a roughness, the superficial scaly incrustation is scarcely now to be perceived. Wishing you equal success in all parts of your professional pursuits, I remain,

Dear Sir,

Very sincerely your's,

WM. BABINGTON.

To Dr. Thornton.

A letter from Mr. Ogle has also been transmittted to the Editor. He speaks of the amendment in this most extraordinary case in terms nearly the same as Dr. Babington's. He imagines the failure of medicine imputable to extreme want of cleanliness :—upon which Dr. Thornton remarks, that the oxygene produced its beneficial effects even under this disadvantage.

CASE

CASE XXXII.

Scrophula.

MARY BUCHANAN, aged 8, lives at No. 2, Witcomb-court, Hay-market; from the account of her mother she was weakly from her infancy. She was two years and a half before she walked; her limbs are crooked, understanding remarkably acute, under lip prominent, eyes black, hair lank; was troubled with worms, both the teretes and ascarides; for which she took Evans's powder, which brought away much slime, and many worms: but, from these powerful evacuations, she was much debilitated, and became subject to profuse perspirations, and for a long while was constantly ailing; when, whether from cold, or what other cause, or the nature of scrophula, I cannot determine, she was seized with deafness; and afterwards with such an inflammation of her eyes, that she was blind for above ten days: leeches were applied to the temples with some effect; but these symptoms only seemed to retire, to give way to a more formidable disease, namely an enlargement of a gland of the neck on the left side, which, for three months, kept on encreasing both in size and hardness; and the child continually leaning on that side, the head became immovably sunk; so that the ear, night and day, nearly rested on the left shoulder. The countenance of the child was pale, body costive, belly large and hard, breath offensive, particularly so towards morning, feet cold, itching of the nose, appetite often keen, but there was no starting in her sleep, grinding of teeth,

or

or any signs of worms observed in her evacuation. She was placed, and continued under the care of my friend Mr. Hill, a week. He gave her rhubarb and vitriolated kali night and morning. Sorrel poultices were applied to the neck, the vital air was inhaled, and the case was going on very well, when Mr. Hill had occasion to leave town, and it was then referred to me. I followed Mr. Hill's practice, and in addition employed electricity on the tumour, and directed a tonic mixture of bark and steel, keeping the body gently open with the powders. The tumour was at this time the size of a goose's egg, and very hard. Since the application of the sorrel, it was looking somewhat red. In a week there was produced a considerable softening, accompanied with violent pains and restless nights. I ordered an opiate in the evening. In a few days after this, I made a scratch, on the most depending part, with a lancet; and repeating this three successive days, on the fourth there issued through this small orifice a bloody serum. I now ordered a bread and milk poultice, discontinued the opiate, and increased the proportion of steel. For several days the bloody serous discharge continued, when I ordered the sorrel poultice to be continued. Almost instantly the purple tumour was rendered florid, the lips of the orifice became of a bright red, violent pain was excited, and, on the next day, matter of some consistency was formed. I moderated the action, when too strong, by a bread poultice; and I sometimes interposed the tonic aperient; and, by always keeping up a due action, in a month the tumour has been wholly removed; the child can turn her head in all directions; she has the appearance and manners of health; and, instead of being disfigured, there remains (as in the

case before related) a scar not larger than a pea, and not discernible but upon the closest inspection.

Observations on this case by Dr. THORNTON.

I. With rhubarb and vitriolated kali, Sir George Fordyce says, he has cured hundreds of pot-bellied children; and calls this powder “antirachitis;” and adds, “had I aspired after a large fortune, concealing the formula, I could have gained immensely by its sale.”

II. I have indeed seen much good produced from constantly evacuating by this powder; but, do we ever observe effects equal to what has happened in this and in the case before related?

III. I should notice, there was a glandular enlargement on the right side of the neck, which was dispersed in a few days by means of a solution of nitre. Did this impart oxygene?

IV. Was not the tumour, which was indolent for above three months, brought to maturation chiefly by the sorrel, electricity, and the inhalation of the air; for this was effected in a fortnight?

V. Did not some benefit arise from discharging the matter by a small opening?

CASE XXXIII.

Case of Leprosy.

AMARO FERNANDEZ, aged 26, has been afflicted with leprosy above seven years. He is a native of the Canary Islands, where we find that disease prevalent, chiefly among the common people, whose food consists almost entirely in salt fish, ill cured, and eaten in a state of putrid fermentation; and this disease resembles elephantiasis, differing perhaps from it only in the extent and urgency of the symptoms. It is generally deemed incurable; and terminates in rendering the unfortunate sufferer a miserable object; depriving him, by its corrosive nature, of nose, ears, palate, and eating away also other parts of the body. It increases by degrees, and sometimes gives a glimmering of hope; but the expectation always proves delusive. I will attempt to trace the progress of symptoms; and shall therefore commence by observing, that in the year 1789, an eruption broke out on his face, arms, thighs, and legs, which appeared like purple petechiæ, and frequently terminated in offensive sores, discharging an ichorous serum. Mercury and other medicines were employed, but without effect; rather perhaps increasing the disorder. In the year 1792 these symptoms having increased, Don Fernandez was recommended to try the Bath waters. In the letter which Dr. Scott wrote to the physician of the General Hospital at Bath, he observes, that he had tried bark, elixir of vitriol, hemlock, and that mercury had been rubbed in for three weeks, but without producing any effect on the mouth. He tried there the warm bath; and

and Dr. — continued the mercury for two months, without its producing the smallest effect; and at length Dr. —, declaring he “ had used mercury enough to salivate a horse,” advised him to return to London; when he became the patient of Dr. Donavan. It would be tedious to mention all the Doctors under whose care he has been, as Drs. Miers, Ralph, Babbington, &c. &c. and many of different countries; and it is impossible to record their several modes of treatment. We shall therefore hasten to the year 1795, and mention the state in which he then was. The sores appear, in 1794, to have healed up, by the application of tar ointment; but the muscles at this time were in a very hardened state, and assumed a very black appearance in both extremities. Under the skin there were many hard knots, and in similar points in the corresponding extremities; and these frequently broke into foetid and deep sores; whilst others dispersed without suppuration; and others again remained stationary. In the year 1795, the nose seems to have been first affected, and the ears, which appeared as if frost bitten, and mortifying off. At this time he was a patient of Dr. Sanderman’s, and able to use exercise, notwithstanding the rigidity of the muscles. The disorder went on increasing, and he left Dr. Sanderman; and, in the year 1796, unfortunately fell into the hands of an Italian physician, who * * * * *
 * * * * * confined him to his bed for six months; ordered a large fire in the room, and no ventilation, and this in the heat of last summer; giving him, at the same time, his grand infallible specific for every disease, which he terms the *Phlogiston of the First Power*. He was at length so debilitated, that he was unable to sit upright in
 his

his bed. If he attempted to stand, his legs failed under him; and he had lost his appetite entirely, and hardly had power to speak.

Seeing him in this deplorable state, I mentioned to our Ambassador, my wish of his trying the vital air, and his Excellency obligingly complied with my desire. Don Fernandez was, in consequence, removed from his bed to an airy situation in Chelsea; tonic medicines were enjoined; and, when he was in a condition to be removed, which was in a week, he daily inhaled the vital air. After his residence at Chelsea but three weeks, under this treatment, he was so invigorated, as to be able to walk to and from Bennet-street, St. James's. In six weeks the muscles were evidently softened; there was a less scaly eruption on the skin; and, at the end of two months, the unsound and sound parts of the nose and ears appeared united; and he is now so strong as to be able to walk from Chelsea to the Exchange, and back, without feeling the smallest fatigue; and his appetite and sleep are the same as if he had never been ill; and he is evidently much increased in bulk. The change produced is so striking, and the trials this patient had made are so numerous, and conducted by so many able physicians, that I cannot but contemplate this, as adding considerably to the reputation already so justly acquired by the pneumatic practice.

I am, dear Sir, &c.

CHARLES DE GIMBERNAT.

London, Oct. 30, 1796.

To Dr. Beddoes.

Surgical Cases and Observations.

CASE XXXIV.

DEAR SIR,

MY friend Mr. Dansey has desired me to send you a few particulars, which I collected from a poor fellow, who was cured of a very extensive ulceration in his neck by the use of the wood-forrel and meadow-sweet, applied in the way mentioned in one of your essays. I most willingly comply with his request, for to you is the poor man indebted for his remedy. It would afford you a real satisfaction, to see and hear with what enthusiasm and gratitude he speaks of his cure and the wood forrel. From this case, and a subsequent trial of it, I believe it to be an application of wonderful efficacy for inveterate ulcerated surfaces. That your humanity and benevolence may be fully gratified by a successful prosecution of your truly ingenious and indefatigable enquiries, in the event of which almost every human being is interested, is the hearty prayer of

RICHARD DUNNING.

Dock, Oct. 8, 1796.

WILLIAM GILBERT, of Londrake, in Cornwall, by trade a shoe-maker, about two years since recovered with difficulty from a fever. Soon after his recovery, he perceived a swelling in his neck, just under his ear.

After

After several months, and a variety of applications, it suppurated, and was opened by a judicious surgeon in the neighbourhood, who attended him a considerable length of time. Under the best management, the sore every day grew worse, and very soon became a miserably ill-conditioned ulcer. He came to Plymouth, and was seen by several eminent surgeons of this place ; who considered his complaint as scrophulous, and ordered an appropriate treatment. No advantages whatever were obtained. The sore continuing to spread, after some time extended from the ear to the sternum ; and, from the poor fellow's account of it, must now have presented an aspect of a most horrible appearance, discharging profusely a thin and highly offensive ichor, and wasting rapidly his constitution. At this period of his complaint, he was mentioning his distressful situation to Mr. Danzay (into whose hands I had lately put your Essays, in which is related a case of scrophula, cured by the wood sorrel and meadow sweet), who told him of this circumstance, and recommended him to give these simples a trial. The poor man most readily adopted his advice, and used them exactly in the way directed in your Treatise. By the use of these simple applications, unassisted by any other means whatever, external or internal, at the end of three weeks from their first use, this very extensive and foul ulcer was completely healed and cicatrized, and the poor fellow nearly restored to his original state of health. He speaks in an emphatic manner of the immense pain the application of the wood sorrel gave him. He says, the pain was so great, he thought *it had knocked him out of his parts !* He has been well about six weeks or two months.

Shefnal,

CASE XXXV.

Shefnal, July 21, 1796.

DEAR SIR,

THE mode of application to the ulcer in the neck was as follows. Immediately after the receipt of your letter we applied a poultice, composed of ground sorrel leaves, one part, and marsh mallow roots, three parts, bruised together, for two days, frequently renewing it. Considerable pain and inflammation was excited at first, the surface of the ulcer appearing of a black colour, as if some active caustic had been applied. Afterwards the meadow sorrel root, bruised, and softened with acid butter milk, was continued for a long time, producing a copious discharge of excellent pus, the ulcer wearing the *best aspect* I ever saw proceeding from scrophulous affection; and lastly, when the discharge began to lessen, and all appearances of swelling were totally gone, it was finally healed by a digestive ointment, made with gum elemi, resin flav. ceræ flavæ et ol. ———. I must observe, that frequently through the progress of the cure, fungous edges were inclined to arise; but a solution of vitriol. canel. in water, answered the purpose of keeping them under extremely well. If the foregoing account should in any way prove unsatisfactory, be so good as point out any further particulars you wish to be informed of, and I will endeavour to recite them as accurately as is in my power. In the mean time,

I remain, &c.

SAMUEL BENNETT.

CASE

CASE XXXVI.

Inflammation of the Breasts.

SIR,

Mrs. LEWELLIN, ætät. 25, lives at Camden-town; she was brought to bed of her first child last July, and, having very sore nipples, she attempted, after a few days, to wean the babe, and for thirteen weeks kept it from the breast; during which time the milk was constantly produced in the greatest abundance, so that it run through every thing that was placed to receive it; notwithstanding nipple glasses, and that the milk was frequently drawn off by means of a glass pipe, by an obliging neighbour. Inflammation gradually ensued, and it occupied the inferior half of both breasts, and, extending down to the umbilical region, was terminated by a distinct line. The babe was now applied to the breast, but would not take to it. The heat and pain became extreme. There were many knotty and hard tumours on both breasts. Matter oozed out from the surface. The pulse was 110, full; perspiration constant and profuse; agony so great, that she was deprived of sleep; and the child not thriving, and continually crying in the night, increased the affliction. She had given up all hopes of recovery, or even outliving many days, when she applied to me; and her case seemed to demand a new practice. Appearing too weak for the lancet, this remedy was precluded. As to evacuations, the same reason weighed also against that plan. The speediest benefit, however, might arise from *disoxygenation* of the blood, and the case was urgent. I therefore filled a bell glass with atmospheric air, and burning two table spoonful of

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æther

æther in it, I rendered it chiefly azote, and inflammable air. She persisted in inhaling this for about five minutes, standing up, until the pulse was obliterated; the eyes became dim, and no longer represented the objects of vision; the face was deadly pale; and swooning coming on, she fell into the arms of a servant, and we placed her on a chair, and I opened the window to admit fresh air. In about ten minutes she revived; she fetched several deep sighs, and appeared faint, and still very languid. The pulse was feeble, and only 98; and for the first time, she said, for some weeks, she felt her breasts cold and easy. I directed her, when she got home, to apply clothes wrung in yeast to the inflamed surface; and I ordered an electuary three times a day of sulphur, and sulphurated kali; and on the sound part, around the inflammation, I directed half a dozen leeches to be applied; and to divert the current from the inflamed parts, I ordered a large burgundy pitch plaster to be placed betwixt the shoulders, which however acted like a blister. On the the third day, when I saw my patient, her spirits were revived; the vivid red colour was abated; the tumours of the breasts were softened; and the milk could be drawn off without torture. Mrs. Lewellin inhaled the air as before, but with less sedative effect; when I ordered four fresh leeches (for the others had died immediately after the operation), and the yeast and electuary as before. On the fourth day there was no longer occasion for leeches, or the yeast fomentation. The electuary, and a reduced atmosphere, were, however, continued; and in a week the cure was perfected; and the child was applied to the breast, and health and happiness were restored to both.

R. J. THORNTON.

CASE.

CASE XXXVII.

Birmingham, Aug. 20, 1796.

DEAR SIR,

I TRANSMIT to you the following hints on the effects of factitious airs in cases of surgery, to induce the humane practitioners of that art to extend the application of them. In the management of large ulcers, when the discharge is thin and copious, the great desideratum is to increase the absorption: for, unless secretion and absorption maintain a just equilibrium, a cicatrix can never be formed. But the most skilful surgeons frequently know not how to accomplish this end. The whole list of general and topical remedies at present known, however judiciously applied, are always slow in their operation, and sometimes entirely fail in producing the desired effect.

Carbonic acid air has been lately found, by Dr. Ewart and others, to promote the absorption of the most virulent matter, from the most inveterate ulcers, in a manner previously unknown. Hydro-carbonate, as far as I recollect, has never been tried as an external application: but I have had repeated proofs of its producing this effect in a powerful and rapid manner, when used as a general remedy.

A patient of mine, afflicted with scrophulous swellings and ulcerations, who had for some time inhaled oxygenic air, and had been much improved in his state of health
by

by the medicine, desired me one day to examine his head, as he feared some fresh ulcers were about to break out there. Upon examination, I found the skin raised in several places, by collections of effused lymph; each tumour containing apparently from half an ounce to an ounce of fluid. In this manner, he informed me, the complaints usually began; the lymph gradually accumulating till it produced inflammation of the skin, and an ulcer, extremely difficult to heal. The process followed exactly the same course when he inhaled oxygen. A mixture of oxygen and hydro-carbonate was then tried: the fluid was soon completely absorbed, and the tone of the relaxed skin perfectly restored. The experiment has been repeated five or six times on the same and other patients, and has uniformly produced the same effect.

In some of the cases, where the constitution was more vigorous, hydro-carbonate alone, diluted with atmospheric air, was used. In others, where the debility was very great, the quantity of oxygen was increased, and the hydro-carbonate given in a very small proportion, so as to produce only a slight degree of vertigo.

From these facts may it not be inferred, that many humours might thus be prevented from bursting, and the admission of common air avoided, which always produces painful and morbid effects on a fine cuticular surface. That hydro-carbonate promotes absorption, is further proved by its effects on the expectoration of phthical patients. In all cases the matter is rendered less copious and thicker by the use of this air, and the difficulty of breathing is at the same time much relieved.

In

In Richard Newbury's case, an account of which I understand is transmitted to you by Dr. Carmichael, the absorption was so rapid, that a quantity of the matter which could not be discharged by the natural emunctories, was deposited on the surface of the skin, and the cure was speedy and permanent. If it be said, that the same effect may be produced by ipecacuanha and other emetics, it may be replied, that the action of the hydro-carbonate is more correct and certain, that the degree of its power can be accurately regulated by the practitioner, and that it produces neither nausea nor relaxation of stomach, by which the patient is deprived of a regular supply of nourishing food.

It might be easy, perhaps, to produce facts to shew, that hydro-carbonate is the most direct, powerful, and easily-managed antispasmodic yet discovered; that it produces no costiveness, like opium, nor any effect whatever, but that for which it is exhibited; and that it will probably be found capable of relieving or removing some of the most distressing calamities that are incident to humanity; such as convulsions, locked jaw, hydrophobia, &c. But at present I mean only to bring forward hints, that others, who have inclination and opportunities, may put them to the test of experiment.

I am respectfully your's,

JOHN BARR.

Extracts

*Extracts of Letters from Mr. SANDFORD, Surgeon,
Worcester.*

I STILL continue to apply the charcoal poultice, with the same beneficial effects as before. I have lately applied it with very beneficial effects to a lady, that had been very extensively scalded, about a week before the application. It soon produced a sloughing, and good pus; though the limb was hard, livid, and approaching to mortification. The sloughing, when it did take place (which was not till many days after the application of the poultice), was so extensive, that a very large and thick poultice was necessary to cover it; and when the sloughs were thrown off, mild escharotics were applied; but in such a way, that the poultice (which was now divided in different portions) was applied to the digesting parts, and the cerete to the other parts, till the whole was healed. By this means the fœtor was corrected, and the healing process forwarded at the same time.

I have also lately applied the sorrel poultice to scrophulous tumours, with very manifest advantage. I have remarked, that sometimes the stimulus, when the bruised leaves are applied, is too great, and induces a high degree of inflammation, attended with great pain. I generally apply the leaves separated from the stalks, well bruised, and added to a soft and well-boiled poultice of oatmeal and small beer. The quantity of sorrel necessary to be added to this poultice, can only be learnt from its effects on the parts to which it is applied. I am now applying it to an ill-conditioned ulcer, with inflammation and hardness of the subaxillary glands, with evident

dent advantage ; and alfo to a fcrophulous knee, on which are feveral fpongy and fluggifh ulcers : both thefe patients are taking the extract of oak bark, with an aromatic (as mentioned in your former publications) and fal. fodæ.

I do not recollect whether I mentioned in my laft, that Mr. Polhill, furgeon to the Englifh Hospital at Leghorn, had lately informed me, that he had very frequently applied diluted lemon juice, with the beft effect, to fcrophulous ulcers on the legs of failors.

In the treatment of *ulcers* in general I have remarked (as no doubt many other furgeons have alfo) that their difpofition to heal depends (let the means of promoting this purpofe be what they may), upon the matter fecreted by them “ being firft thickened by increafing the ab-
“ forption in *them*, and then leffened, till all the matter
“ is abforbed which is brought by the arteries, inftead
“ of being depofited in the ulcers,” as Dr. Darwin has ingenioufly fuggelted. See the fecond volume of his *Zoonomia*, p. 47. The action of forrel and lemon juice, applied to fcrophulous ulcers, probably effects its purpofe in a two-fold manner ; as, firft, by ftimulating the languid inirritable abforbents, by means of the oxygene contained in thefe fubftances ; and, fecondly, promoting the abforption of the thinner parts of the matter, in the fame manner that acids, when taken into the mouth, coagulate vifcid phlegm.

REMARKS

REMARKS.



I. CASES XXIX. XXX. and more particularly XXXI. and XXXIII. (attested, as they are, by three different observers) will not fail to occasion further trials of oxygene air in obstinate cutaneous diseases. The principle of the great efficacy ascribed to it in these cases, I take to be its power of exciting the arterial system. There have been transmitted to me (without permission to make them public) observations, in which the effects of stronger action in the minute arteries are very apparent. Such are the amendment or thickening of the matter secreted from ill-conditioned ulcers, and the renewal of the suspended discharge of issues. Had oxygene gas been known centuries sooner, it might have proved a resource against the most loathsome malady that has afflicted mankind; for the contagion of leprosy seems to have diminished the power, and destroyed the life, of the cutaneous capillaries (*See Hensler vom auffsatze. Hamburg, 1790.*). At present, this species of air deserves a trial in those kindred disorders, that occur not infrequently in hot climates, and are sometimes seen in these latitudes (*Rapp. des Commiss. de la Societé Roy. de Med. sur la Mal Rouge de Cayenne, ou l'Elephantiasis. Paris, 1785.*).

Case XXVIII. of an obstinate ague, cured by oxygene air alone, indicates a power that could hardly have been anticipated by speculation. We have lately received confirmation of the efficacy of an expedient, in use among the Dutch fishermen, for stopping an ague fit. It consists in arresting the circulation in one arm and one leg, at the commencement of the cold stage; by which the influence of the brain and the effect of respiration are confined to part of the body, and may be supposed to occasion greater energy of action in that part. Will the inhalation of oxygene, by heightening the effect of respiration, prove equivalent to the Dutch practice? The case will not be overlooked by those who have the treatment of agues that do not yield to the *mineral solution*, to bark, or the broad-leaved willow, which has appeared to me fully to answer the character given of it by Mr. James (See his *Observations*. Johnson, 1792).

II. I have formerly pressed the use of oxygene in the latter stage of low fever, and of that very fatal disease, the confluent small-pox. No direct decisive trials have come to my knowledge; for Case XXVIII. goes only to shew, that oxygene air may be administered with safety: and in Mr. Murdock's daughter, in whom it is reported to have produced sudden change for the better, when she was near the point of death (see letters from Dr. Withering, Dr. Ewart, and others, p. 23), we have but a solitary instance of decisive power.

Those experiments, however, on the power of the vapour of mineral acids to destroy *contagion*, which
have

have been made within the last 25 years, and which of late have been prosecuted with the ardour they deserve, seem to furnish strong evidence of the use of oxygene in the debility of bad fevers. This conclusion, I think, distinctly results from a comparison of the different methods practised within the period assigned.

Mr. Morveau, reflecting probably upon the power ascribed to acids over contagion, conceived the idea of filling an infected atmosphere with marine acid vapours. These he successfully applied to the sweetening of places filled with putrid exhalations (*Journ. de Physique*, I. 436.). And, (*Ibid.* III. 73) we have an instance of the purification of a place, infected with jail fever. The facts were also recorded in the *Mem. de Dijon*. The commissaries of the Paris Academy recommended an annual purification of prisons in this method (*Mem. Acad. de Paris*, 1780.). The rooms were evacuated; and, oil of vitriol being added to common salt, they were kept shut for some time. Mr. Morveau supposed the acid to unite with the volatile alkali which suspended the infectious miasmata. I rather imagine that *febrile* contagion, at least, is much allied to volatile alkali in its composition, and that it is neutralized by acids.

The French never afterwards lost sight of this application. In October, 1787, I remember accompanying M. et Mad. Lavoisier, M. Morveau, M. Chauffier, Dr. Fourcroy, and other philosophical persons, to the Dijon Hospital. After mentioning the singularity of the foundation, and pointing out the elegance of the inscription,
they

they enquired whether acid vapours, in M. Morveau's method, were not in familiar use in England. They spoke as if perfectly convinced of their efficacy. In 1791 Dr. Fourcroy thus prefaced his proposal for employing oxygenated marine acid, in void infected rooms: " On fait déjà que la vapeur de l'acide muriatique - - - - - a rempli ce bûit, et qu'elle a parfaitement réussi à M. Morveau. (*La Med Eclairée*, II. 89.) In the beginning of 1794; (as is seen from the quotation, Appendix, No. VI.) it had been ascertained by the members of the *Conseil de Santé*, that a smaller quantity of M. Morveau's mixture of common salt, water, and sulphuric acid, moved about to every part of an occupied sick or foul room, would perfectly sweeten and *disinfect* it; and that this process occasions no disagreeable or incommodious sensation. It has been lately said by an English writer, that the French do not " appear to have suspected, that the power of destroying contagion is a quality inherent in all mineral, and probably, to a certain degree, in all acids, under certain circumstances." (*Dr. F. C. Smyth, on the Jail Distemper*, p. 203). In the *Instruction*, however, of which the Author is here speaking, this power seems to be expressly ascribed to all acid fumes:—*ce n'est point que le vinaigre, mis en expansion dans une bouteille à large orifice, ne puisse, comme TOUS LES ACIDES dans l'état de gaz, former des combinaisons avec les miasmes ammoniacaux putrids, les détruire et rendre à l'air, dans lequel ils étoient comme dissous, sa pureté et son élasticité.* (*Journ. de Physique Ventose*, an 2, p. 167.) If the vapour of nitric acid has really not been used in France, might this not have happened, because so much gunpowder was wanted for destruction, that no nitre could be spared for preservation? In

In 1780, Dr. J. C. Smyth appears to have succeeded in destroying a most pestilential contagion at Winchester, principally by acid fumes. He had the floors and walls of the prison and hospital wards, also the hammock posts, as high as the ceiling, freely watered with diluted marine acid. Gallipots, containing fuming nitrous acid, were kept day and night in the inhabited wards; and the infected utensils and clothes were washed with marine acid.* This acid probably acted with still greater efficacy than Dr. Smyth conceived; and, if there be an analogy between certain species of contagious effluvia and volatile alkali, the small quantity in which marine acid may neutralise those effluvia, will hardly be imagined, but by those who have observed the action of marine acid air upon alkaline air, and the manner in which bright iron is affected by a small quantity of marine acid, set at liberty in a spacious apartment.

Although these methods succeeded so happily in preventing infection, there is no evidence of their having contributed to the recovery of the sick; till, in consequence of the meritorious perseverance of Dr. J. C. Smyth

* Dr. S. having mentioned the fuming yellow nitrous acid, and the nitrous acid, as detached from nitre by vitriolic acid, adds—"In one or other of those forms I have used it, both in hospitals and in private practice, for 16 or 17 years past" (Jail Disl. p. 193.). It is singular, if he had used the latter method 16 or 17 years before 1795, that he should have deflagrated nitre in 1780, by a hot iron, with a view to extricate vapour of nitrous acid. This Dr. S. confesses was a mistaken view; but he thinks the deflagrated nitre "furnished a quantity of oxygene, or air much purer than the common air of the atmosphere." (p. 174.)! and thus purified the wards!

Smyth, a careful trial of the fumes of nitric acid, copiously raised by sulfuric acid, took place on board the Union hospital ship (*Dr. Smyth's Account of the Exp.* Johnson, 1796.). The managers of the experiment were struck, not merely with the destruction of the offensive smell arising from the crowded sick, but with the change in the course of the disease. Mr. Menzies says, "As none of the sick, who have been brought to the Hospital since my arrival, have died, it would seem that the fumigation has not only lessened the danger of infection, but also *the malignity of the disease.*" p. 19. Mr. Bassan, the surgeon of the ship, asserts, that the symptoms are much meliorated. I believe," he adds, "that the fumigation has been of *great service to the sick.*" (p. 24.) For this operation, it appears from the report, that neither of these gentlemen were looking; and Dr. Smyth says, "that the vapour of the nitrous acid should be found to destroy an offensive smell, the effect of animal exhalations, I was not surpris'd at, having myself had repeated experience of the fact; but, that it would also render the air purer, and more proper for respiration, I was by no means certain, until I found the repeated observations of these gentlemen confirmed by the evidence of Mr. Keir." (p. 51.)

No oxygene gas is extricated during the distillation of marine acid; nor does marine acid gas shew any of the eminent effects of oxygene. In the distillation of nitric acid, oxygen gas is extricated; and nitric acid gas shews eminently the effects of oxygen. The fumigations, therefore, in which oxygene gas and analogous vapours were
extricated

extricated with benefit to persons ill of a low fever, countenance very strongly the proposal for exhibiting oxygene gas for the cure of febrile (not inflammatory) disorders.

It would be curious to know the effect of these oxygenating fumigations on scorbutic patients : but, in consideration of the seemingly fatal effects of exposure to a free atmosphere, I should not feel justified in venturing the trial. If the acid fumigations become general in the navy, inevitable accidents will teach us, whether oxygene, from its stimulating effect on the arteries, is pernicious or beneficial in scurvy. We should not now have been ignorant, had they been in use last year, when the whole Channel fleet had been nearly disabled by the scurvy ; for while in port, it was supplied (I suppose on account of the dearth of fat cattle) with salt meat.

III. Mr. Patterson's experiments with nitre in vinegar have not yet, I apprehend, been sufficiently authenticated to afford, to persons acquainted with those of Dr. Trotter, much hope that the scurvy can be cured without fresh vegetables. The facts being granted, it has been asked, upon what principle can nitrous vinegar oxygenate the system, when nitre alone does not ? Can it be, that the nitric acid is rendered more easy of decomposition, by the attraction of the acetic acid for the vegetable alkali ? We know little of the action of salts, compounded of two acids and an alkali, even on dead matter, except what Mr. Keir has discovered (*On Metallic Solutions*. Phil. Trans.).

IV. The study of a method to render oxygene more efficacious, and to produce it in greater purity, deserves
the

the attention of those who think it likely to become an useful remedy. I have met with cases in which it seemed to have no action on the sluggish arteries. A lady, whose extremities were habitually icy cold, began with two, and came to take a hundred, quarts a day, sometimes pure, and sometimes diluted. I never could perceive any change of the pulse during the inhalation, even of sixty quarts. At length, however, the torpor of the extremities was overcome by it. Dr. Clark, of Newcastle, had an enfeebled patient, who received benefit from oxygene; and, as Dr. C. thinks, would have received much more, if the power of the oxygene could have been enhanced. I am now about to try two methods of effecting this; and doubt not, but by the Institution for ascertaining the virtues of airs, a mode of increasing its power twenty fold will be discovered.

I never was afraid, that elastic fluids would fail of a trial; but I am now seriously apprehensive that they will be abused. In London, if I am not misinformed, in consequence of benefit to some distinguished persons, besides those whom I have been permitted to name, a rage for respiring them seems to be kindling. In some cases no good, in others much harm, will ensue. And we may see *that* realised which prudent men have augured of other good medicines undistinguishingly administered: *variis hisce ausis metuendum est ne in neglectum vel despectum recidant.*

END OF PART IV.

PART V.

PART V.

SUPPLEMENT
TO THE
DESCRIPTION
OF A
PNEUMATIC APPARATUS,
FOR PREPARING
FACTITIOUS AIRS;
CONTAINING A
Description of a Simplified Apparatus,
AND OF A
PORTABLE APPARATUS,



By *JAMES WATT, Engineer,*

DESCRIPTION

OF A

Simplified Pneumatic Apparatus.



AUGUST, 1796.

THE Pneumatic Apparatus, described in Dr. Beddoes's *Considerations on the Medicinal Use of Factitious Airs* (Part II. Ed. grd.) and in a separate Description of that apparatus, is found to answer its intention, so as to leave little to desire upon the head of utility or convenience. What is now offered relates merely to a simplification which may effect a reduction of price; at the same time that in the hands of a sensible practitioner, it will not essentially abridge its utility in the preparation of oxygene air, and of the inflammable airs from charcoal and from iron, though it may not be so proper for the preparation of the zincic inflammable air, or the fixed air from chalk.

If it were natural for mankind to think first upon the simplest methods of performing any process or construct-

ing any machine, some apology might be necessary for not bringing forward this simplification sooner ; but the contrary seems to be the case ;—at least the method now proposed did not occur to the writer until very lately, and some doubts being entertained, whether or not it might answer as well as it does, it was thought proper to refer that matter to the test of experiment, which has occasioned some delay.

The simplification consists in laying aside the hydraulic bellows and refrigeratory, and conveying the air directly from the fire-tube, wherein it is generated, to the airholder. This was always thought a desirable object ; but it was considered, that if the air were conveyed from the fire tube into the airholder by the pipe U, which receives it from the bellows, it would require a very nice regulation of the exit of the water at the lower pipe Z, to prevent the water in the airholder from weighing with its whole column, thereby making a degree of exhaustion in the fire-tube and conducting-pipe, and drawing in the atmospheric air at every ill-closed joint ; the advantage of washing the air, and condensing the steam in the refrigeratory, would be lost, and there would be opportunity of examining the quality of the air from time to time. A very simple idea has in great measure obviated these inconveniencies ; it consists in making the lower pipe (z) of the airholder inclined at an angle of 45 degrees, and of such length that the lower edge of its mouth shall be a little higher than the upper edge of the inner opening, by which it communicates with the airholder (see z, plate 4th, fig. 2.). The airholder being filled with water, and the pipes k, t, and U very well corked, so as to be air-tight, it is evident that no water can run out, though the sloping pipe z be opened, because the

water

water cannot issue without the entrance of the air, and the latter is prevented from entering at *z*, by the upper edge of the inner opening being lower than the surface of the external water in that pipe. It is exactly in the same case as the water in the common reservoir glass for birds, into which the air only enters in consequence of the bird exhausting the water in the little cistern.

Now, in order to receive the air from the fire-tube, as it is produced, all that is necessary is, instead of fixing the conducting-pipe *F* horizontally, to make it somewhat bent, so that its lower end may be inclined at an angle of 45 degrees to the horizon, or thereabouts, and to fit to that end the tin tube (*u*), the end of which being introduced into the sloping pipe *z*, so that its opening, which is in its upper side, shall be fully within the cavity of the airholder; the air as it enters will ascend to the upper part of the airholder, and will displace its own bulk of water, which will issue through the pipe *z*, by the side of the pipe (*u*), which occupies only a small part of the opening. The situation of the respective parts of the apparatus, applied in this manner, is shewn in plate 4th, fig. 1, more intelligibly than it can be expressed in words.

TO PREPARE OXYGENE AIR. — The manganese being pounded, and put into the fire-tube, the joints being made good, as pointed out in the former part of these directions, and the conducting pipe *F* fixed as has just been explained, and supported at a proper height, the pipe *z* being well stopped with a cork, and the other pipes *k* *t* and *U* both open, fill the airholder quite full of water, and cork the upper pipes very securely, anointing the corks with some china clay luting, place the airholder upon its stool in the shallow tub, which is to receive

ceive the water; bring the pipe *z* close to the small pipe (*u*), and uncork *z*; then move the airholder towards the small pipe, and insert the end of the latter into *z*, as has been directed; raise the end of the small pipe as high as the opening in the airholder within *z* will permit; and support it there by a small wooden wedge put under it in the mouth of *z*, apply your fire, and the air as it is produced will enter the airholder, and the water thus displaced will issue at *z*, and be received in the tub. When the airholder is emptied of water, down to the level of the under edge of the mouth of *z*, air will begin to issue at *z*. The airholder must now be removed, and, if more air is wanted, another airholder put in its place.

TO WASH THE AIR. — Slack some good quicklime, and, when fallen to dry powder, sift it through a common hair sieve, preserve it in a pot close stopped for use. If the powder feels damp, dry it over the fire. Provide a tin tube, open at both ends, wired at one end and plain at the other end; its dimensions may be three quarters of an inch in diameter, and four inches long. Dip this tube with its cutting end downwards into the pot filled with the slacked lime, and if the lime is deep enough, it will be filled with it, otherwise it must be dipt again in a fresh place until it be filled with lime. Insert the end of this pipe into *z*, and push the lime into the airholder by means of a piece of wood. If the air is tolerably pure, two fulls of this pipe will be sufficient for half a cubic foot, and four for a cubic foot airholder. The lime may also conveniently be put into the airholder, by thoroughly mixing the desired quantity with half a pint, or a pint of water, and pouring it in through a funnel by the pipe *U*, at the top of the airholder, the
pipe

pipe Z being previously corked. When you have put in the lime, cork z, and shake the airholder very briskly in every direction for about three minutes; then removing the stool, place the airholder in the water in the tub, so that the water may cover the opening of z; pull out the cork, and the water will enter and supply the place of the fixt air absorbed; repeat the shaking, until, upon opening the pipe z under water, none enters. Replace the airholder upon its stool, insert the end of u into z, and, by the introduction of more oxygene, displace the water which had been admitted, cork the pipe z, and set the airholder in a cool place till it deposits the suspended manganese, which it will do in less than twelve hours, before which time has elapsed none of the air should be used.

If you want to examine the quality of the air before you receive any into the airholder, place the end of u in a basin containing water, in sufficient quantity to cover the end of the pipe, and to stand an inch or two higher; then having filled a common bottle or vial with water, place your thumb upon its mouth, and invert it with its mouth under the surface of the water in the basin, directly over the opening of the pipe u; the air as it issues will ascend into the bottle, and may be examined by the common tests; or, by holding a lighted taper over the opening of the pipe, you may see by the brightness of the flame, whether or not the air produced is much dephlogisticated.

In general, the air from Exeter manganese has little other admixture than fixed air in small quantity, probably mostly produced by the action of the oxygene on the carbons of the iron tube. Sometimes pieces of a
brown

brown toad stone, with whitish spots, are intermixed with manganese : these pieces will be easily distinguished in breaking the manganese, and should be picked out, as they yield fixed air instead of oxygene. When you mean only to try the air by its effects upon flame, that may very conveniently be done, by placing the airholder in such a manner, that the opening of the conducting pipe, instead of being fully within the airholder, may lie in the sloping pipe, though under water (or by pulling out the small peg in the side of F.) When your trials prove satisfactory, the airholder is to be brought so much nearer the furnace, that the opening of the pipe (*u*) may be quite within it.

CAUTION. In operating upon small quantities of manganese, care should be taken to place them in the middle of the fire-tube : near the ends it may not receive the due heat.

HYDRO-CARBONATE. In preparing this air, the fire tube should be red-hot before any water is admitted by the water pipe ; and before the airholder is applied, water should be admitted pretty freely to dislodge any other air which the charcoal may have imbibed. After about five minutes rapid production of air (which should be conveyed up the chimney by a pipe placed over the opening of *u*), the entry of water should be somewhat restrained, and the airholder set in its place, as has been directed for oxygene.

The process goes on with a proper speed when the large airholder, containing a cubic foot (about 24 ale quarts) is produced in twenty minutes, or half an hour, while the fire-tube is fully red-hot. If water is admitted

too freely, steam will be produced, and would pass into the airholder and heat the water there. Besides, a superfluity of water causes the production of a greater quantity of fixed air, than takes place when the operation goes on slowly. In order to free the hydro-carbonate air perfectly from fixed air, it may be washed with lime, as has been directed; but may be used as soon as the washing is completed, the suspended charcoal seeming rather advantageous than otherwise.

This species of air is found to be more or less powerful in producing sensible effects upon the human body, according to circumstances in its preparation, which are yet unknown. It merits to be verified by experiments, whether the degree of the heat of the charcoal does not affect it; and in the same way it ought to be determined, whether the charcoal of different vegetable substances do not produce airs of somewhat different qualities as to their medicinal effects.

FERRIC INFLAMMABLE AIR, may be prepared as directed for the hydro-carbonate.

It has been observed, that this method is not recommended for the preparation of the zincic inflammable air, nor for the fixed air from chalk; in both of these a superfluity of water seems necessary, and there being no refrigeratory to condense the steam, it would heat the water in the airholder.

In many experiments, the hydraulic bellows and refrigeratory afford a great convenience, the former in readily ascertaining the quantity of air produced, and the latter, by condensing the steam; and, when quick lime

is mixt in the water, by absorbing fixt air and other acid vapours. If the manganese is of a good quality, and no inflammable matter is mixt with it, the mixture of lime with the water of the refrigeratory, and the use of the agitator, will render it sufficiently pure to be breathed, especially if it is administered considerably diluted ; but, when given with small admixtures of common air, the utmost purity is necessary. As in preparing oxygene air, the exact quantity of materials necessary cannot previously be ascertained ; if more than fills an airholder be produced, it may conveniently be retained in the bellows till wanted. If azotic air should prove useful, as it is very probable may be the case, its preparation from burning charcoal requires the use of the hydraulic bellows. These bellows also make a good machine to inhale mixtures of air from, in place of the silk bags.

Every person wanting an apparatus will see from what has been said, the advantages and disadvantages of this simplified apparatus, and be enabled to judge for himself. To those who principally wish to prepare oxygene and hydro-carbonate airs, there seems no doubt that it will save money in the first cost, and some trouble each time the apparatus is used ; but, to those who wish to make experiments upon various airs, the hydraulic bellows and refrigeratory seem necessary.

LIGHTING THE FIRE. Some gentlemen complain that the fire in the furnace is difficult to kindle, and that some time elapses before it attains the proper heat. This may be remedied by covering the furnace with a conical tunnel of a foot high, having an opening at the vortex of four or five inches diameter ; but if this tunnel be not removed

removed as soon as the fire tube becomes red-hot, which may be neglected, there is a risk of melting or spoiling the fire-tube. The readiest and safest way seems to be, to light the fire in the furnace, by means of some chips and a shovel full of live coals, with the proper quantity of coaks; and to let the lining of the furnace become red-hot before the fire tube is put in; which may easily be done by taking out some of the coaks, and removing the rest to the sides of the furnace, so as to make a clear passage for the fire-tube, which, having one of its end pieces previously luted into it, must have the joint of the other made good before it has time to become too hot. The coaks which have been taken out, on being replaced, will readily light again, and much time will be saved in heating the tube.

AIRHOLDERS. This simplified apparatus cannot advantageously be used with fewer than two airholders of a cubic foot each, or more of smaller sizes; and the large furnace and apparatus ought to have at least three airholders of the large size. The large airholders and their contents of water weighing near seventy pounds, it will be found convenient to fill them standing in their place upon the stool in the tub; or, which may in several respects be more convenient, though more expensive, to use a double number of three-gallon airholders in place of them. Airholders of six quarts are convenient for sending out doses of air to patients.

MOUTH PIECES. Many patients with difficulty acquire the habit of inhaling air from a bag, and returning the air from their lungs through the nose. Some make such deep inspirations and strong exertions, as to fatigue their lungs and the respiratory muscles, whereby spasmodic
pains

pains in the breast have arisen, which in some cases have been imputed to the facitious air; but the same pains arise in such persons when only the common air of the atmosphere is inspired in the same manner, and even when no bag is employed: a mouth-piece has therefore been constructed with two valves of silk, upon the same principle as that communicated to Dr. Beddoes by Mr. W. Capper, and published in the second edition of the Considerations. It is, however, very much smaller, gives less resistance to the air, and is constructed so as to be applied to the small end of the faucet of the oiled silk bags. With this mouth-piece a person may breathe perfectly in their natural manner, without straining the muscles of the breast, and without any other subjection than the holding a small pipe in their mouth, the end of which is, for the greater ease, made in an oval form.

Queries, however, arise, whether those deep inspirations are not of service, by opening the small vesicles of the lungs, and giving them greater exercise? Also, whether the hydro-carbonate, at least, may not produce good effects, by acting upon the nerves of the nose during the expiration of the air? Without attempting to solve these doubts, it is certain that the use of the mouth-piece does not preclude the taking deep inspirations; nor, when thought necessary, the expiration through the nose, though it lays the patient under no subjection to either of them.

ALEMbic, or FIRE-POT. This vessel may be used for the preparation of oxygene air in this simplified apparatus; *but it ought not to be used for the preparation of hydro-carbonate air; for the water coming first into*
 contact

contact with the red-hot part of the water-pipe, before it reaches the charcoal, hydrogen air appears to be produced instead of hydro-carbonate; at least, it frequently happens that the air prepared from charcoal in this vessel, has not the power of causing vertigo, whereby some gentlemen have been disappointed in the effects expected from the air.

DESCRIPTION

DESCRIPTION

OF A

Portable Pneumatic Apparatus.



PERSONS who have not occasion for large quantities of factitious airs, especially invalids while upon a journey, will be enabled, by means of this apparatus, to prepare them readily in any situation where they can command a common parlour or kitchen fire.

Practitioners in medicine may also by means of it, make trial of this new branch of their art, at a moderate expence; but it ought not to be supposed that it can supply the quantities of these airs that some cases require, and still less, that by means of it a number of patients should be supplied.

As oxygene and inflammable airs ought not to be prepared in the same fire tube, the apparatus is provided with one for each of these species of air. The fire tube for oxygene air, is made somewhat like a pocket liquor flask, the flattened form of which permits it to enter between the bars of a common grate. Its dimensions

enable it to contain about a pound of powdered manganese, which will generally produce half a cubic foot, or three gallons of air, at one operation.

The figure of this fire tube is delineated in pl. 5, fig. 1, A. and its cross section in its widest part at B.

The fire tube for preparing hydro-carbonate air, is delineated at A, pl. 5, fig. 2, and its transverse section at B. It consists of two parallel hollow cylinders united together, each open at one end, and communicating with one another at the bottom or shut end. The water pipe is adapted to the mouth of one of these hollow cylinders, and the conducting pipe, by which the air issues, is adapted to the mouth of the other cylinder ; so that the water, when converted into steam by the heat of the tube, must pass through and among the whole matter contained in both of them, before it can make its exit.

This fire tube (C) with its water pipe (F) and conducting pipe (D), together with the airholder, are represented in their proper positions when in use, at fig. 3, pl. 5. It was judged unnecessary to give a representation of the oxygene fire tube when in use, as such representation would differ in nothing from that given, excepting in the absence of the water pipe, which is not needed in preparing oxygene air.

One joint of the conducting pipe D, is made partly of hammered iron, and the others of tin-plate, japanned. In order to avoid too great nicety in adjusting the place of the airholder, a short flexible tube is interposed betwixt two of the four pieces, of which, for convenience of carriage, the pipe is composed.

Either

Either of the fire tubes, when applied to use, being previously charged with the proper material, is to be introduced between two of the bars of the fire grate ; or, if none of the interstices are wide enough, it may be laid above the upper bar, and the coals heaped over it. If the grate is not deep enough to permit the fire tube to enter far enough into it, when placed at right angles to the bars, it may be put in obliquely ; from which the farther advantage will be derived, that the airholder, not standing directly before the fire, may be more easily screened from its rays.

The lower end of the conducting pipe turns up a little, and is to be inserted in the pipe z of the airholder, in the manner directed for the simplified apparatus.

It is proper, before any operation is commenced, to adjust the height of the support of the airholder, and its place in the tub or pail, which is to receive the water ; otherwise, if the fire tube heats quickly, some of the air will be lost before these matters can be adjusted. In defect of a stool, bricks or short pieces of board may be used as a support for the airholder ; but, where the apparatus is used at home, a stool will be found most convenient.

To prepare OXYGENE AIR, fill the fire tube (of fig. 1, pl. 5) with manganese in coarse powder, up to the narrow part of its neck, lute the end piece E into the fire tube, and introduce the tube into the fire, lute the iron part of the conducting pipe into the end piece, and, when the heat has hardened the lute, apply the other parts of the conducting pipe, previously luted to one another. The airholder being filled with water, and set upon its stool in the tub or pail, uncork the pipe z, advance the
airholder

airholder, and insert the end of the pipe D into z. The operation will then go on as has been said in the description of the simplified apparatus. When the oxygene air has displaced the water, and filled the airholder, the fire tube should be immediately withdrawn from the fire, to prevent the needless calcination of that tube. If the joints have been well luted, it may be pulled out by taking hold of the iron part of the conducting pipe, by means of a cloth, to prevent burning the hands.

The end piece sometimes flicks very fast in the fire tube; it may be loosened by striking it gently side ways with a small hammer, upon the bead which is formed round its outer end. Violent blows do not answer the end, and are apt to damage the end piece.

To prepare HYDRO-CARBONATE AIR, fill both the cylinders of the fire tube, Fig. 2, Pl. 5, with small bits of charcoal, none of them exceeding a quarter of an inch cube; insert the water pipe into the mouth of one of the cylinders, and the end piece of the conducting pipe D into the mouth of the other, luting them properly; place the fire tube in the fire grate, and when the heat has hardened the lute, proceed to the adjustment of the remainder of the apparatus, as has been directed.

When the fire tube has become perfectly red hot, admit water by the water-pipe, pretty freely, in order to expel any noxious matter contained in the charcoal, and suffer any air which is thus produced to escape. When this part of the operation has been continued for five or ten minutes, restrain the water, and bring the airholder into its place. With a proper degree of heat and due exhibition of water, a three gallon airholder may be
c
filled

filled in half an hour, without any steam passing into the conducting pipe, which is known by the tin parts not becoming hot.

To prevent the water in the cup from being heated by the fire, it is necessary to interpose a fire shovel, or something similar, to screen the cup from its rays. If the water is suffered to boil in the cup; or in the perpendicular part of the water pipe, none will enter the fire tube; therefore it is also proper not to fix that part of the water pipe in its place till all the rest of the apparatus is adjusted. The airholder may be screened from the heat by a sheet of brown paper.

The hydro-carbonate fire tube is made double, that the water may pass through a greater length of heated charcoal, and may act more immediately upon it, and less upon the iron; for if the water were transmitted slowly into a red hot pipe, it would act upon the iron, and produce Hydrogene air before it reached the charcoal; and it appears from experiment, that the hydrogene dissolves none of the charcoal in its passage through it. This has sometimes happened in making hydro-carbonate in the alembic of the large apparatus, and renders the fire tubes preferable for that purpose.

CAUTION. Though common stove grates do not generally produce too much heat for this purpose, yet with some sorts of coal, and in particular circumstances that may happen, and if not guarded against, the fire tube may be melted or spoiled. A moderate red heat is sufficient for producing either the oxygene or hydro-carbonate air.

Furnace.

Fig. 1.



Fig. 2.

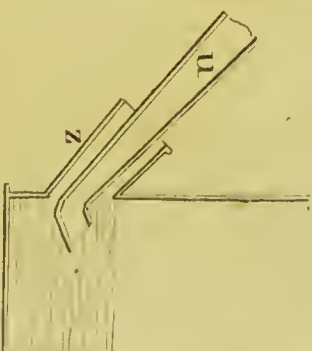




Fig. 1.

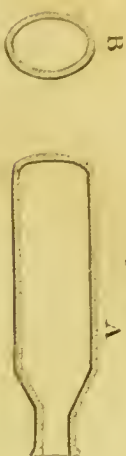


Fig. 2.

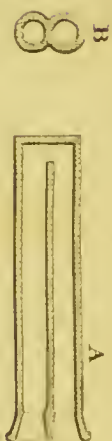
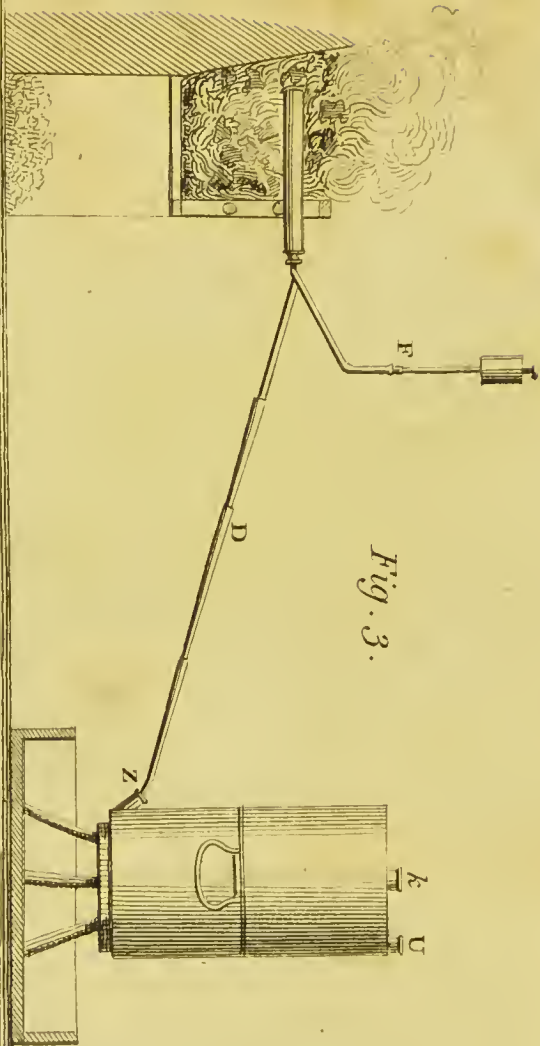


Fig. 3.



AIRHOLDERS, proper for this apparatus, are two of three gallons each, or one of that size, and two of a gallon and a half each. The latter will be found convenient for carriage in a post-chaise.

PACKAGE. Sets of this apparatus are put up in boxes adapted to them, when so desired, for the convenience of carriage.

P O S T S C R I P T.

OBSERVATIONS

UPON

Hydro-carbonate & Oxygene Air.

WHEN a fire tube is used for the first time, any air which is prepared in it has a bad smell : oxygene air in such cases contains a larger portion than usual of fixed air, and the hydro-carbonate of sulphurated hydrogen. These have been with justice imputed to the carbone and sulphur contained in the cast iron of the fire tube.

With a view to correct this inconvenience, a new fire tube, which yielded very offensive hydro-carbonate, was loosely filled with dry slacked caustic lime, and subjected to heat : it gave out, as was foreseen, a considerable quantity of ferric hydrogen, not remarkably ill smelled. When it ceased yielding air, which was after it had been above an hour red hot, it was cooled and filled with charcoal, as usual for hydro-carbonate ; the air it then yielded smelled like heated steel or burning phosphorus ; in short, it had the same sort of smell as hydrogen air. A query then arose, whether it had the power of causing vertigo. A stout young man inhaled a quart of it, mixed with

with twenty-two quarts of common air, without being in any ways affected by it, which would not have been the case, if it had been prepared as usual. It would then seem, that the vertigo is owing to the admixture of sulphurated hydrogen, which its usual smell indicates this air to contain. If this should prove to be the fact, and any part of its curative powers depends upon its producing vertigo, that effect may be secured or augmented, by mixing the borings or turnings of *cast* iron with the charcoal; or perhaps still better, by the admixture of plumbago, or black lead in powder. If, upon the contrary, the vertigo does not contribute to the cure, the medicine will prove more pleasant to the patient, and it is believed may be uniformly prepared free from the sulphureous smell, by mixing a little *perfectly caustic*, and dry slacked lime, with the charcoal powder.

The effect produced upon the tube by the lime, does not seem to be permanent; for, in a second operation with the same tube, and out of which the charcoal had never been emptied, the air produced had some degree of the sulphureous smell.

It has been mentioned, in the first part of these directions, that a mixture of charcoal powder with slacked caustic lime, produces an inflammable air, without the addition of water, and that the charcoal is consumed in the process: and it has since been found, that a mixture of hammered iron turnings and charcoal produced very good hydrogen air, and that the iron was perfectly calcined by the operation.

This is not quite the proper place to enter upon theory, yet, as it will naturally be asked by some of my readers,
how

how these things are to be accounted for, and I wish to throw all the light I can upon the subject, I shall give the explanation of it which appears to me most consonant to the modern theories, though it has perhaps another cause. Slacked lime contains a quantity of water as one of its constituent parts, and which it attracts so strongly, that it will retain the greatest part of it even when red hot, provided no attraction more powerful tends to separate it; but red hot charcoal also attracts water; and it would seem that its attraction for it is stronger than that of lime; the latter is therefore dispossessed, and left in a dry state; and the water, united to the charcoal, forms hydro-carbonate or some species of inflammable air, having charcoal for a basis. In the case of the iron, the same thing happens, and hydrogen is formed. Granulated zinc mixed with lime, will probably form zincic inflammable air.

In respect to the medicinal properties, all I know is, that the inflammable air from charcoal and lime contained no fixed air; separable by washing with quick lime and water, and that it did not cause vertigo when inhaled pure.

OXYGENE AIR. This air is also rendered more pure and more free from fixed air, by preparing the fire tube, by heating it full of quick lime, as has been mentioned for the hydro-carbonate; then emptying out the quick lime, and filling it with manganese in coarse powder as usual.

The preparation of the fire tube with lime should be renewed from time to time, whenever an extra produce
of

of fixed air shows the necessity. It might perhaps be serviceable to mix quick lime with the pounded manganese ; but it has been found, that when the lime was not perfectly caustic, it gave out its fixed air, and did more hurt than good, serving only to prevent the sulphureous smell that oxygene sometime has. .

Oxygene air should never be prepared in a fire tube used for hydro-carbonate or hydrogene.

THE

THE SIMPLIFIED AND PORTABLE
PNEUMATIC APPARATUS,

ARE MANUFACTURED BY
BOULTON & WATT,
OF SOHO, NEAR BIRMINGHAM,
AT THE FOLLOWING PRICES.

THE LARGE SIZE SIMPLIFIED APPARATUS.

The furnace, 18 inches diameter, lined with the
best fire bricks, tongs and poker, two fire tubes,
two end pieces, two rings, iron plug, water
pipe and cup, iron conducting pipe and its tin
end piece, with one large airholder and funnel £ 6 16 6

AUXILIARY ARTICLES FOR DITTO.

Two large-sized airholders, one spare fire tube,
cast-iron pot for a sand heat, two oiled silk bags
and bellows to fill them with common air - 3 6 0

THE SECOND SIZE SIMPLIFIED APPARATUS.

The furnace, 13 inches diameter, and other ar-
ticles as above, fuitable - - - - - £ 4 15 9

AUXILIARY ARTICLES AS ABOVE.

But the two airholders, second size - - - 2 15 0

THE PORTABLE APPARATUS.

One oxygene and one hydro-carbonate fire tube,
with end pieces, water pipe and cup, conduct-
ing pipe, one second-sized airholder and fun-
nel, and an oiled silk bag - - - - - £ 2 12 6

AUXILIARIES.

One second size airholder, two spare fire tubes
and bellows to fill the bag with common air - 1 2 6

* * Packing Boxes and Carriage to be charged extra.

The Pneumatic Apparatus, with Hydraulic Bellows and
Refrigeratories, continue to be made as usual.

See Part II. for the Prices.

Addition to the Supplement.

When this Supplement was printed, it was thought that those who would use the Simplified and Portable Apparatus, were already provided with the first Part of the Directions ; but it appearing that such is not always the case, and some additional Directions and Precautions having since occurred, as useful, the following Descriptions and Directions, principally applicable to the Simplified Apparatus, are now added.

THE FURNACES are cylindrical, made of sheet iron, and lined with fire bricks of the best kind, secured in their places by a ring of iron at the mouth. Two circular holes are made in the opposite sides of the furnace, to permit the fire tubes to be fixed across the centre of the fire, when in use. When the alembic or fire pot is used in the larger furnace, these openings are stopp'd up with plugs of fire brick ; and when the fire tubes are used, the excess of the diameter of the holes over that of

the

the necks of the fire tubes, is shut by cast iron rings which fit the necks of the tubes.

As some may have other uses for the furnaces, there is a fire door hinged to one of the openings, and a chimney pipe adjusted to the other, which, with a cast iron pot fitted to the mouth of the furnace, renders it very convenient for a sand-heat, in which the mineral acids, and other things can be distilled. By shutting both openings with their brick plugs, it may also be used for such operations in an open fire as do not require very great heats.

On the one side of the ash-pit is a register, or sliding damper, by which the admission of air, and the heat of the fire may be regulated; for even in the processes for producing the facitious airs, though no chimney is used to make the furnace draw, if the coaks are good, the heat sometimes rises so high, as to injure the fire-tubes. On the other hand, some coaks are stubborn, and burn slowly; in which case a tunnel, such as is described in this Supplement, (p. 10) is useful; but it will require attention on the part of the operator to avoid the injury just mentioned.

The furnace for the larger apparatus, is 14 inches diameter within the lining, and 18 inches over all; the depth to the grate is 11 inches, and the depth of the ash-pit about 7 inches.

The furnace of the smaller apparatus is 9 inches diameter within, and 13 inches over all; the depth to the grate is 9 inches.

The

The FIRE TUBES are of two kinds ; those for oxygene air are now made to shut at one end, principally to prevent their being accidentally used for making inflammable air : the other end is open, but somewhat contracted, that it may require a smaller end piece : this contracted part forms a cylindrical neck, which extends through the thickness of the brick lining, and to which the cast iron ring is fitted. The remainder of the tube is cylindric.

The fire tubes for the inflammable airs are similar to the other : only that they are open at both ends, that the water necessary for the production of these airs may be admitted at one end, while the air issues at the other. To the open ends of the fire tubes are fitted *end pieces*, ground conically to a joint with the inside of the neck of the tube, beyond which the end pieces are bent at right angles ; one of these bent parts stands perpendicular, and its perforation receives the lower end of the *water pipe* ; the other, which is wider, lies horizontally, and receives the end of the conducting pipe F, to which it may always remain attached. The oxygene fire tube has only one end piece, which fits the conducting pipe. The other, or close end of this fire tube, when in use, is supported upon a piece of cast iron fitted into the hole in the furnace.

The WATER PIPE has a cup on its upper end, the mouth of which is crossed by a bridge of iron, through which is screwed a wire, conical at the lower end, which stops the orifice of the pipe, and as it is screwed up or down, admits more or less water, or entirely stops the hole. The lower end of the water pipe is ground into
the

the perpendicular opening of the end piece which belongs to it ; and when in use this pipe should stand perpendicular. The conducting pipe F is shewn in the drawing, and has been described.

The ALEMBIC, or FIRE POT. This vessel is only used in the largest apparatus, and is very convenient for making oxygene air, but does not answer so well for making hydro-carbonate air, as has been mentioned ; therefore these vessels are not now fitted with water pipes, unless particularly ordered. They have the advantage that they can be used in almost any furnace that is large enough, or even in a wide kitchen grate : but, as the manganese lies more in a mass in them than in the fire tubes, the operation does not go on so speedily as with the latter, and part of the manganese towards the centre does not yield all its air.

AIR-HOLDERS. One of these vessels is represented in pl. 4, k, U, fig. 1, and the manner of using it in the simplified apparatus is explained in pages 4 and 5 of this Supplement. They are made of tin-plate, japanned inside and outside. They are joined in the middle by a cement of four parts bees' wax, and one part of common rosin. By warming the joining before the fire, they can at any time be taken asunder and cleaned ; and joined again with the same cement applied hot. The centre pipe k, reaches very near to the bottom of the vessel ; and the other pipes, U and z, merely enter it. The use of z has been explained, page 4 ; and that of the others shall be explained in describing the manner of transferring the air into the silk bags. Air-holders are made of three dimensions ; the largest contains six gallons,

lons, or a cubic foot of air; the middle size three gallons, and the smallest one gallon and a half.

The OILED SILK BAGS are commonly made to contain from 20 to 24 ale quarts of air. They are found to be more convenient to inhale the air from, and to transport it from one room to another, than any other existing contrivance. They will contain the air for some hours, but it is best to fill them immediately before the air is used. The dimensions stated answer very well in common practice, where the dose of the *factitious* air does not exceed three pints; but, where larger doses are required, it is advisable to have larger bags made on purpose. Smaller bags, which contain in all only a quart or two, are made for taking out small quantities of air for trials of its quality, or to perform philosophical experiments.

When the silk bags are out of use, they should be hung up by a string tied to the neck of the faucet; folding or creasing them is hurtful. When they meet with any accident, the hole may be mended by pasting over it a patch of oiled silk larger than the hole, by means of japaner's gold size, or any other tough linseed varnish. Both the patch and the circumference of the hole should be anointed with the varnish, and suffered to dry till it is just sticky to the finger; when the patch should be pressed down on its place, and allowed to dry before the bag is again used.

MANGANESE, for the purpose of preparing oxygene air, should be free from calcarious earth and noxious minerals, such as lead, arsenic, or copper. A very good
kind

kind is found near Exeter, which seems to possess these properties.

The presence of calcarious earth may be detected by pouring diluted nitrous acid upon the powdered manganese; for, if it contain any, there will be a *continued* effervescence, which otherwise would not take place. The other minerals may be detected generally by the eye, and always by the known chemical essays. The Mendip manganese, which is always mixed with calcarious earth, also frequently contains small portions of lead.

The very best of the Exeter manganese has a crystallized fracture, with somewhat of the appearance of a lead ore, though of a darker colour: another good kind is amorphous in its fracture, and very hard: that which is very tender, and of an earthy or rusty appearance when broken, does not generally contain so much air, though what it contains is equally pure. All these kinds are found in the same vein, and are unavoidably mixed in the parcels; sometimes also there are small lumps of a brown stone, with whitish specks, like toadstone, among it; which will be easily distinguished in breaking it, and should be rejected, as they contain fixed air.

A pound of the hard part of Exeter manganese yields about 1400 cubic inches of air, nearly pure oxygen, with a very small quantity of fixed air.

The fire tubes, or the alembic of the large apparatus hold about six pounds of pounded manganese, which yields generally from four to five cubic feet of oxygen
air;

air; and those of the smaller apparatus contain about three pounds of manganese, and yield from two to two and a half cubic feet of air. The fire tube of the portable apparatus holds one pound, and produces about half a cubic foot of air.

CHARCOAL, for making hydro-carbonate air. The best is that of the softer woods, avoiding that of oak and fir. It should be prepared by heating it to full ignition, either in a covered crucible, or in an open fire, and then extinguishing it by means of water, or by putting it in a clean earthen vessel closely covered. When used, let it be broken into small bits, or coarse powder, which, with the fine dust arising in breaking it, are to be put into the fire tube.

IRON TURNINGS or BORINGS. Those made from hammered iron produce hydrogen air more pure than those of cast iron. The latter contain carbone and sulphur in considerable quantities; and the air made from them partakes of the nature of hydro-carbonate. These turnings and borings of both kinds are sometimes contaminated with oil or grease, from which they may be freed by heating them red-hot in a crucible, and quenching them in water.

FIRE-LUTE. To join together the parts of the apparatus which are exposed to considerable heat, take China or Porcelain clay from Cornwall (*not pipe clay*), pound it, and mix it to the consistence of thick paint, with a solution of two ounces of borax, in a pint of hot water; or in default of China clay, slacked quicklime, mixed up in the same manner, may be used. This lute may be kept ready mixed up in a covered pot. COLD-

COLD-LUTE, for the joints of the conducting-pipe, and corks of the air-holders, take equal parts of china clay and wheat flour, by measure, and mix them to a proper consistence with cold water. This lute is more tenacious than the other, but it does not keep well; the other may in general be substituted for it.

FUEL. The most manageable for the furnaces is good coaks, or cinders of pit coal, in pieces not less than a walnut, nor larger than a goose egg. Charcoal of wood also answers very well, but is more expensive. Some use small pieces of clear-burning pit-coal, free from sulphur, and not charred or coaked; but such coals cannot be had every where.

DIRECTIONS

DIRECTIONS

FOR

Using the Apparatus.

HYDRO-CARBONATE AIR. This process being more complicated than that for making oxygene air, is first described.

Put one of the iron rings which serve to fill up the openings in the sides of the furnace, upon the neck, or small part of that end of the fire tube which you destine for the water pipe. Anoint the conical part of the end piece belonging to it with some of the fire lute. Insert the end piece into the opening of the fire tube; press it in, twisting it a little round; then give it a gentle blow with a piece of wood, or a small hammer, to force out the superfluous lute, which stroke up round the joint. Raise the tube upright upon that end piece, and put into it first some largish bits of charcoal, to avoid choaking the end piece; then, by the help of a wide funnel, put in the small charcoal, till the tube is quite
* e full

fall up to the other neck ; striking the tube on the sides from time to time, to make the charcoal subside. Stop the open end with the iron plug, or a large cork, and pass the fire-tube through the holes in the furnace made to receive it ; put the other iron ring upon the other neck, so as to fill the hole in the furnace on that side ; take out the plug, and turn the tube round, till the bent part of the end piece for the water pipe stands upright. Then, having luted the end of the conducting pipe into the other end piece, anoint the conical part of that end piece with fire lute, and put it into its place in the fire tube, as has been directed for the other ; taking care that the conducting pipe lie at the proper inclination to the horizon, as shewn in plate 4. When the water pipe stands perpendicular, the inclination of the conducting pipe will be in that part governed by the height of the support of the air-holder, which, with the place of that vessel in the tub, should be regulated before you fill the fire-tube. The lower end of the water pipe should now be anointed with lute, and twisted into its socket in the end piece. The wire should be screwed quite down, a little water put in the cup, and the whole left at rest until the fire tube is red-hot. The process is then to be managed as has been directed in this Supplement, pages 17 and 18.*

To

* In the preparation of hydro-carbonate air, no water should be admitted until the fire tube has been for some time red-hot. It is also found preferable to reduce the charcoal to small bits, or to a coarse powder ; and in the portable apparatus to change the charcoal, putting in fresh at every operation ; otherwise air will be produced which has not the power of causing vertigo.

To extinguish the Fire after the operation, shut the ash-pit door and the air-register, and lay an iron plate upon the mouth of the furnace; the fire will then be soon extinguished, without damage to the fire tube.

FERRIC HYDROGENE, and also FIXED AIR from Chalk, are to be managed exactly in the same manner, only that, especially in the latter, the heat must be somewhat greater than is necessary for charcoal, say a *full* red heat, and the chalk broken into bits not exceeding one-third of an inch square.

In all these processes care must be taken that the fire tube be quite filled with the material from which the air is to be produced; otherwise the steam will pass over without suffering or causing any decomposition.

By mixing about one-sixth in bulk of cast iron turnings or borings with the charcoal, you will be more certain of obtaining air which has the power of causing vertigo; and by mixing about one fourth in bulk of fresh-slacked lime with the charcoal, the air produced will not cause vertigo. This air I call *pure* hydro-carbonate, the medicinal powers of which are not yet ascertained.

ZINCIC, or FERRIC HYDROGENE, may be obtained by mixing about two ounces of granulated zinc, or the same quantity of iron turnings, with a pound of recently slacked lime in the oxygene fire tube, and applying heat without water, as for oxygene.*

OXYGENE

* Slacked quick lime may be kept for any length of time quite fresh, or caustic, by preserving it in a well-corked glass bottle.

OXYGENE AIR is prepared according to the directions in page 16; great care should be taken that no bits of coals, charcoal, or other combustible matter, be mixed with the manganese; otherwise such mixture would cause the production of a very pungent fixed air, which would be deleterious in cases where oxygene is proper. Manganese may be examined for its contents in lead or copper, by dissolving it by heat in the muriatic acid diluted; the lead will remain in the form of a whitish calx, and the copper will be made sensible by the addition of volatile alkali turning the solution green. Manganese calcined in close vessels, with charcoal, becomes green; which has led some people into the error of supposing it to contain copper; whereas calces of copper heated red hot become red. Oxygene air should be kept in the air-holder for twelve hours, that it may deposit the manganese which comes over with it, before it is used.

TO TRANSFER THE FACTITIOUS AIR from the air-holders into the bags. All the pipes of the air-holder containing the air being corked, the short pipe U is to be uncorked, and the nozzle or faucet of the bag wrapped round with a slip of soft rag, wetted, and tied on by a small thread, is to be forced *tight* into that pipe. Then, and not before, uncork the centre pipe K, place the funnel in K, and pour in a measure of water, equal to the quantity of air wanted for a dose, holding up the bag with your hand, that the air may meet with no resistance, the desired quantity will be transferred into the bag. Having replaced the cork in K, shut the orifice of the faucet,

faucet, by putting your thumb upon it, on the outside of the bag, remove the faucet from the pipe U, and cork that pipe.*

The bag is to be filled with common air, by inserting the faucet into the nozzle of the common bellows, to be had with the apparatus, and blowing with them till the bag is about half full ; when it should be gently clapt on the sides, in order to mix the common and factitious airs. After which it is to be blown completely full ; and the faucet being corked or stopped with the finger, it is to be removed to the place where it is to be used.

It is a bad practice to put the dose of factitious air into the bag, and send it in that state to the patient at a distance, to be there filled with common air : the factitious air either escapes, or may be contaminated by the bag, so that little effect may be produced. The air-holder appropriated to the patient should stand in his apartment, unless he resorts to the practitioner's house. Air-holders should be appropriated to each species of air, and should be properly labelled to prevent mistakes. They should be kept in a cool place of an equal temperature, and the corks should be good and tight. If sent to a distance,
they

* The slip of rag should be very neatly wrapt round the faucet, and always wetted at every time of using ; otherwise the air may escape by the side of it, instead of entering the bag ; and the bag should always be held up by the hand, and kept from such folds as might impede the entrance of the air. When the bag is clapt on the sides, the faucet should be shut by the finger.

they should be packed in a locked basket or box, to prevent injuries.

INHALATION OF THE AIR is performed by taking the point of the faucet between the lips, inhaling from the bag through the mouth, and expelling the air from the lungs through the nostrils; which operation most patients readily acquire a habit of performing with ease: but those who cannot do it, may use the mouth-piece, described p. 11. It should be recommended to patients not to hurry themselves, to inhale gently, and to retain the air a little in their lungs before they expel it. It is also proper, especially in the use of the hydro-carbonate, for the patient to rest a little at every five or six inhalations, to observe whether any vertigo takes place: and even in using oxygene, an unexperienced patient should rest to avoid fatiguing the lungs, which of itself may cause some giddiness.

DOSES OF THE FACTITIOUS AIRS. Where symptoms do not decidedly indicate larger doses, it is prudent to begin with a pint of oxygene air, in a bagful or half a bagful of common air, that is to say, diluted with from 20 to 40 times its bulk of common air, and gradually to increase the dose as symptoms direct; observing always to dilute with at least 20 times the quantity of common air.

This dose may be thought too small to produce sensible effects; but it will frequently produce very considerable ones; and in some cases, where the system is very irritable, may prove an over-dose.

Patient

Patients with a slow firm pulse, will generally bear large doses; but those with slow feeble pulses, are generally more readily affected by it. In diseases occasioned by want of irritability, very large quantities have been given before any effect was produced, even several cubic feet per day; but, as in such cases the oxygene was given little diluted or pure, it appears probable that more was given than would have been necessary, had it been sufficiently diluted; for, if pure oxygene air is inhaled, it will be found, upon its emission from the lungs, to be still highly dephlogisticated; but, when diluted, it has more time to act, and more of it is probably absorbed.

The hydro-carbonate having powerful effects in causing vertigo, ought always to be administered cautiously: where there is much debility, it may be prudent to begin with half a pint of this air, diluted with 10 or 20 pints of common air, to be increased in the subsequent doses, till each dose shall cause vertigo: how far the latter effect should be pushed, must depend upon the situation of the patient, and the nature of the disease. Patients with a *strong* quick pulse, can in general bear large doses of this air, and its immediate effect is rendering the pulse slower; whereas in patients with quick *weak* pulse, it generally renders the pulse quicker and weaker immediately after the inhalation; though its subsequent effect is to render the pulse slower and stronger, if it takes effect upon the disease.

It has seldom been found necessary to give more of this air than from two to three quarts per day, until the patients have been long habituated to the use of it; and
in

in all cases where the air has been very lately made, it is proper to give only half the usual dose; but, after four or five days keeping, it seems to suffer little further change. The oxygene air keeps good for months, if the corks are good.

To enable practitioners to judge of the size of the apparatus which their practice may require, the quantities of oxygene air which each size can produce at one operation are recapitulated.

The largest apparatus can produce about four cubic feet at one operation; which will require four of the largest, or eight second sized air-holders to contain it; a great number of air-holders may be necessary, because some patients may require the air to be sent out to them, and may not use it so fast as others. In such cases, especially where the administration of the air is likely to be continued some time, it would seem reasonable that such patients should pay for their own oiled silk bags, if not for the air-holders.

The second size apparatus will produce about two cubic feet of oxygene air in each operation; which will require two largest, or four second sized air-holders to contain it.

The portable apparatus produces three gallons of oxygene air at each operation; which requires one second size, or two smallest air-holders to contain it.

As the charcoal does not waste fast in the operation for hydro-carbonate air, the operation may be continued
with

with propriety until double the above quantities are produced in the respective apparatuses; but it is evident, that in such cases, a proportionate number of air-holders must be provided for this air, in addition to those required for oxygene.

From the above it will appear, that the largest apparatus is necessary for hospitals, practitioners of great practice, or who do not chuse to resort often to a fresh operation: the second size to practitioners of more confined practice; and the portable apparatus to patients who chuse to prepare their own airs, and to gentlemen who wish to try experiments. To those who require considerable quantities of air, the frequent repetition of the process with this portable apparatus will be found troublesome; and it is further to be remarked, that the consumption of fire-tubes is less in proportion to the quantities of air produced in the larger than in the smaller apparatus; and that nothing will tend more to avoid unnecessary repetitions of operations, than the being provided with a sufficient number of air-holders, or other proper recipients for the air.

The smallest air-holders, containing six quarts, are convenient for sending out air to patients at their own houses.

OXYGENE FIRE TUBES, when new, ought always to be prepared by filling them with fresh slacked lime, and keeping them an hour red-hot, as has been directed above; but Hydro-carbonate tubes ought not to be so prepared, otherwise the air obtained from them will not have the power of causing vertigo.

BOULTON & WATT beg leave to inform
Gentlemen ordering the Pneumatic Apparatus, that the
articles called AUXILIARY are necessary to the Appara-
tus, and that in general greater numbers of Air-holders and
Silk Bags are wanted than what is specified: which, how-
ever, can be supplied at any time on short notice, as well as
the following articles:

Best picked Exeter Manganese.

Cast Iron Borings.

Cornish China Clay, for Lute.

Borax for ditto.

SETTLEMENT

SETTLEMENT
OF
AN ACCOUNT OF FACTS
BETWEEN
THE EDITOR
AND
A COUPLE OF CRITICS.

SETTLEMENT
OF AN
ACCOUNT OF FACTS.

IN the XXXVIIIth No. of a certain Review, an attempt has been made to discredit the facts, affirmed by Sir Jeremiah Morrifon.—“*The whole*, it is remarked, “*SEEMS a flimsy fiction.*”—These scruples, if the professions in the Review are sincere, had in part an honourable origin. They are said to have arisen from the flagitious nature of the facts, and from a probable and obliging surmise, that the Editor of the Collection of Cases fell upon the fiction as likely to promote the subscription to his proposed institution for investigating the medicinal effects of gasses, and to gain him proselytes. Were the question to be determined by internal evidence, would the former reason weigh any thing with those who are acquainted with the effects of zeal?—For the latter, as the Editor has direct testimony at hand, he will not trouble himself to uncover its nakedness. Before he produces his testimony on the subject of the enraged Apothecary, he thinks it proper to re-affert, that a full authenticated narrative was sent to him for publication

in Part III. It appeared, however, to him sufficient to stigmatize the transaction in general terms.

“ The Apothecary, whom you mention in your work, actually delivered in his bill, and threatened arrest, wholly because my patient, Mr. D——, determined to inhale the vital air. Before, they were in habits of great intimacy. If you choose to publish this in compliment to the British Critic, you have my permission as well as that of my patient.

R. I. THORNTON.”

On this point the Editor will only add that, however he may be disposed to compliment the Review in question, he prints the attestation chiefly with a view to shew that the imputation was not thrown out at random.

The Editor would have been glad to insert an attestation concerning the incident between the Baronet, his lady, and daughter, and the CANDID Doctor. But the practitioner, from whom he received an account of it, and who had his information from the first of the above-mentioned four parties, desired that his name might by no means be brought forward to the public, without a call, sufficiently respectable, or sufficiently urgent. At the request of the Editor, however, he did relate it to two persons well known in public life, and acquainted with the physician alluded to: so that the Editor has now a lease of three lives for this piece of private history.

In this same article of criticism, several mistakes and inaccuracies, though not perhaps of any great moment, might be pointed out. The Reviewer speaks of the

“ FOR-

“FORMIDABLE apparatus with which the airs are administered.” Those who have read the description of Mr. Watt’s apparatus, so as to understand it, or have seen the thing itself, will be amused with such a character of a varnished silk bag, furnished with a faucet. For such is the apparatus with which, according to the directions in the pamphlet, and the general practice, the airs have been administered. Another inaccuracy occurs in the following sentence:—“*The Editor after all consoles himself with the hope, that if this country should ungratefully reject his inventions, they will be adopted by the French.*” This is not true. The Editor drops not a syllable of complaint or despondency, of hope or consolation. He simply expresses an assurance that the French, who have made such capital discoveries in pneumatic chemistry, will not fail to cultivate pneumatic medicine.

The passages where this Reviewer talks of *regular physicians*, p. 590. of *Myersbach and Brodum*, p. 592, the Editor at first considered as intended to insinuate calumny, and to form injurious associations. While this impression lasted, he laboured under the very weakness which a late lively writer has thus described from his own feelings:—“*Comme l’humanité est faible ! J’ai été assez bête pour être sensible à vos insinuations calomnieuses. Peu s’en est fallu que je ne me sois emporté avec violence contre Monsieur le Rapporteur qui se presentoit alors à mes yeux comme un imposteur aussi maligne en intentions, qu’impudent en suppositions.*”

“*Vous entendez bien, Citoyen, que tout cela n’étoit que l’effet du premier moment.*”

No wonder the Editor should so soon correct himself. He had only to call to mind the first motive for disbelieving the Baronet's facts; which shews the writer to be gifted with the innocence of the dove. However, therefore, he may fare as to the cunning, he surely cannot harbour the venom, of the serpent.

This acknowledgment, it is hoped, will repair the momentary injustice of an imputation of malice. If not, the Editor professes himself willing to do all further in his power. As nothing more likely to be acceptable occurs, he thus publicly offers his interest to bring the Reviewer acquainted with the venerable Baronet. In sentiments and morals he believes them perfectly suited to each other; and how agreeably must the anonymous, but *not unknown*, gentleman be surprised, at finding himself by Christmas closely leagued in friendship with a person, whose existence he questioned at Midsummer!

THE second Critic, against whose strictures the Editor has to tender a bill of exceptions, is a writer in the *Medical and Chirurgical Review*. An article in No. XIII. affords a curious example of the levity with which some people will hazard assertions, when they are sheltered from responsibility and shame. P. 614 of the Medical Review it is said, concerning the two well-known cancerous patients at Bath, "We understand them to have fallen victims to this dreadful disease. A speedy recurrence of the symptoms took place, which the remedy
" had

“ had no longer a power of mitigating.” Anxious for a repetition of the interesting experiments of the late Mr. Magellan and Dr. Ewart, the Editor had sought every opportunity of satisfying the public, that mitigation of the pain of cancer, for an indefinite time, might be expected from the application of carbonic acid gas.

In Part III. of his Considerations, he adduces the authority of Dr. Ingenhoufsz, who speaks from personal enquiry and inspection. According to this accurate physician, “ the ulcer gives no pain when the air is applied,” and “ it always is better for the remedy.” Dr. I.’s letter is dated Oct. 12, 1795. At a still later period, Mr. Sandford found the patient kept “ *completely easy*,” by carbonic acid air. See his letter of Jan. 19, 1796, in the 3d edit. of Parts I. and II. of the present publication, p. 128.

THE Editor solicited permission from these two Correspondents, to publish the result of their observation and enquiry. For false reports concerning these patients had been industriously circulated ; and whatever might be the intention of such reports, their tendency was to discourage further trials. The assertions, so confidently advanced in the Medical Review, have induced him to apply for still further information, which he here lays before the public.

BATH,

BATH, *Aug.* 26, 1796.

DEAR SIR,

IN answer to your enquiries respecting the two Cases of Cancer which I formerly published, I have the pleasure to inform you that Alford, the subject of the first case is not dead, as has been reported. Sometime after her dismissal from the Infirmary, the breast again ulcerated, the carbonic acid air was again applied with relief to the pain, but although persisted in for a long time, the sore did not, as before, assume a disposition to heal. It remained however easy. * * * * *

* * * * * have no doubt contributed much to increase her complaint, and rendered it necessary that she should be discharged.

The other patient died several months after the publication of my pamphlet. She continued to the last to apply the air, which kept the sore uniformly free from pain, and prevented its spreading. She had a complication of other complaints latterly, much more distressing to her than the cancer, and fully sufficient to occasion her death; particularly an incessant cough, to which she had been more or less subject for some years, with a profuse expectoration of very unseemly matter, and great difficulty

culty of breathing. She was also attacked with frequent and severe nephritic pains, accompanied by fever, which in the course of some days were commonly relieved by a discharge of calculous concretions by urine, of considerable size.

I am, dear Sir,

Your's, &c.

J. EWART.

To Dr. Beddoes.



THE Editor knows not whether the Medical Reviewer will become more circumspect in future ; but his readers will probably perceive what sort of a genius he is for affirmation.

It would be easy to assign a satisfactory reason why the carbonic acid was not constantly applied to ***** . But the Editor does not choose to drag an unfortunate woman's frailties into day, in compliment to a blundering Reviewer. Let him make enquiry for himself ; and, if he gets as good information as before, he will acquaint the world that the miller of Billericay himself, after he had determined not to be fat, was not so remarkable for abstemiousness from all liquids, as the poor patient, whom
c he

he, dead-doing critic! has demolished at one stroke of his goose-quill.

These are facts, which can admit no dispute. In the same 13th Number are to be found opinions no less unwarrantable than the assertions are false. The Editor is sorry to observe either the one or the other, in a publication which he had often praised for impartiality, and for which he thinks practitioners, remote from collections of books, obliged to Mr. Boosey.

“ The application of the new chemical doctrines to
 “ the philosophy of medicine, continues to be pursued
 “ by Dr. Beddoes and his coadjutors, with unabated
 “ industry. Additional proofs are daily afforded of the
 “ great influence of salutious airs on the animal system.
 “ We are sorry, however, to observe so strong a ten-
 “ dency to speculation in the propagators of this doc-
 “ trine. There is much reason to fear, that truth will be
 “ for some time obscured, rather than developed, by the
 “ enthusiasm of this class of enquirers. That the hasty
 “ adoption of their doctrines should meet with much
 “ opposition from the faculty, was naturally to have
 “ been expected. Men accustomed to think in a cer-
 “ tain train, imposed by education and early acquired
 “ habits, are not to be shaken in their opinions by every
 “ doctrine that wears the face of novelty. Indeed, the
 “ cause of truth is in all probability much served by this
 “ very caution, which has been so much ridiculed. New
 “ doctrines have frequently arisen, which have worn as
 “ imposing an aspect as those of the aerial projectors;
 “ which yet time and further enquiry have as frequently
 “ over-

“ overturned. By this early opposition the authors of
 “ novel opinions are obliged to furnish themselves with
 “ new weapons, if any such are to be found, in their
 “ defence. *The acrimonious attacks, therefore, which have*
 “ *been made by this new sect,* ON ALL WHO FOR WANT
 “ OF CONVICTION, *withhold their assent to their con-*
 “ *clusions,* are not more repugnant to reason in them-
 “ selves, than unavailable to the support of the cause
 “ they have undertaken to support. Had they recol-
 “ lected what took place at the introduction of the cir-
 “ culation, and on many other memorable occasions of
 “ discovery, they would see how little reason there was
 “ to apprehend that their opinions would be borne down
 “ by authority, without the appeal to impartial enquiry.”

This occurs in p. 601, and in p. 613, the writer returns to the charge. As Dr. Beddoes is the only person here named, and as the whole paragraph must seem levelled at him along with others, if not at him exclusively, he thinks that if it had not been intended to involve him, he has a right to charge the Reviewer with culpable inadvertence, in not expressly excepting him. If such was the intention, he has something further to say.

Dr. B., did he possess sufficient abilities, would disdain to waste them in maintaining a Warburtonian despotism over medical literature. He has spoken, and may again speak, with asperity of persons who endeavour by *immoral means to stifle investigation*. And he should not be sorry, if he could remove that barbarous antipathy to the advancement of knowledge, under which some few Doctors still labour. But what has this to do with attacking *any one*, much more “ *all who for want of conviction,*
 e 2 “ *withhold*

" *withhold their assent to* " his "*conclusions?*" A distinction, such as this, is pretty obvious; though people sometimes may not observe, or may not choose to observe, it. Shortly after the appearance of Moliere's *Avare*, a Harpagon in real life was heard to complain, that "*no decent careful housekeeper could live in peace, for,*" added he, "*a man must now-a-days turn spendthrift, if he will*" "*not be exposed by these profligate playwrights.*"

In the foregoing quotation, the terms, "doctrines," "coadjutor," "sect," all convey an invidious, and as far as the Editor is concerned, an absolutely false meaning. He originally denominated his ideas on the action of gasses *conjectures*, and has always since represented them as nothing better. He has not hesitated to quit and to disavow them, whenever he has found them inconsistent with facts. Fearful that it might not be in his power to render essential service to medical science, he early determined to guard against entangling his understanding in the cobwebs of his own hypotheses. In particular cases he has doubtless seen gasses salutary beyond any means known to him. But he has been careful to state that he would not "*give the smallest assurance of success,*" in any one denomination of disease.—(See the outline of a plan for a Medical Pneumatic Institution.)—In the beginning of the last century, a noted Doctor on the Continent raised a loud outcry about his *gas* and his *blas*; and unblushingly boasted, "*Nova morborum principia, ut et hactenus inaudita theoremata dedi ac demonstravi.*"—But is his an example for any man of common prudence to imitate now-a-days?

The word "*sect*," denotes a number of people, having certain dogmas in common. The Editor agrees in disposition with those, who are ready to exert themselves to improve the art of healing. He is determined to seize any promising means whatever that may conduce to this purpose. Nor has he any the smallest predilection or prejudice towards solids, liquids, aerial or ætherial fluids, as the fixed letter of his publications will attest. With the opinions or works of others, he has nothing to do. He ought not therefore to share their praise or blame. He has never been privy to the design or execution of any publication respecting pneumatic medicine, except such as bear his own name. And he has been much less hurt by all the censure than by some applause which he has incurred.

"*Opinions borne down by authority!*" He has ever been a stranger to so pitiful an apprehension; nor did he require to be schooled by a stupid rehearsal of *sententiae aniles*. Concerning this enquiry, he had often enough expressed his firm persuasion that nothing could arrest its progress. But menaces or artifices, such as he knew on good authority to have been actually employed, might in the mean time prevent this and that individual from obtaining such benefit as the external or internal use of airs can afford. This alone was a sufficient motive for exposing the practices to which recourse has been had.

The various miseries of mankind have from time to time suggested various remedial plans to the Editor. Of these he has suppressed some, and given very slight intimation of others. For they were such as his contemporaries (according to his estimate of their receptivity) would

would not relish, because they had not yet been lashed by the bloody scourge of statesmen into a sufficient knowledge of what is good for them. He fancied, however, that they might be brought to perceive the propriety of investigating the curative powers of elastic fluids. Instead therefore of designs of greater utility perhaps, but more remote from current notions, he has taken pains to recommend this, and he hopes with eventual success.

On other points, the Editor has the misfortune to be dissatisfied with the representation given by this cautious and well-informed censor of medical authors. In p. 603, for instance, Mr. Herdman is said to have refuted the opinion that the excitability of the animal fibre depends on oxygene. Dr. Girtanner, with whom no one individual perhaps in this country has declared his concurrence, may indeed have been refuted. The task was truly easy. But that the oxygene received in respiration, and distributed to the muscles, combines with azote, hydrogene, and carbon, to form water and various saline compounds, is a supposition which no one has yet shewn to be at variance with fact. The two hypotheses differ essentially; and in this very number, the Reviewer notices the Editor's objections to that of Dr. Girtanner, but inaccurately imputes to him the translation of that author's papers.

From the statement in the Review, it might be concluded that the Editor had adopted for his motto :

Oxygen est quodcumque vides, quocumque movcris.

How justly, let the following sentences, from his earliest speculations, bear witness : " Attention is undoubt-
" edly

“ edly not less due to the other elements of organized
 “ bodies ; and if the importance of oxygene seems to
 “ have been magnified in the foregoing observations, it is
 “ only because we have few or no facts which afford a
 “ foundation for reasoning concerning the connection of
 “ an excess or deficiency of hydrogene or azote, with
 “ the functions of life.” *Observations on Calculus*,
 p. 164.

The rear of this article is brought up by Dr. Ferriar’s prediction, that “ further trials” with airs, “ will be undertaken, with hopes much reduced and “ eagerness greatly allayed.” It is not surprising that a writer who has so entirely entered into Dr. Ferriar’s mode of thinking, and so exactly copied his style, should so highly extol his writings, and so emphatically quote his authority. But, in truth, hope and eagerness—feelings varying in different individuals and at different moments in the same individual—are little to the purpose : and when it is designed to render disappointment more glaring, to talk of high expectations is a stale rhetorical trick. In difficult researches, diligence, accuracy, and fertility in resource, are the qualities requisite. The Editor judges that apparent success, even in a few cases, is a better reason for proceeding with alacrity, than failure at first in a number of trials, for despondency, especially as the modes of trial are susceptible of so much variation. Let the impartial and the discerning decide which way of thinking is the more philosophical.—

And now, courteous Stranger ! thou who hast audited this long account, if thou be satisfied, it is well—if thou be wiser, thou hast good luck—if thou have been entertained, it is full as much as the writer expected.



APPENDIX.

N^o. I.

Remarks on the GASEOUS OXYD of AZÔTE
or of NITROGENE, and on the effects it pro-
duces when generated in the stomach, inhaled into
the lungs, and applied to the skin :—

Being an attempt to ascertain the true nature of
CONTAGION, and to explain thereupon the
phenomena of FEVER.

By *SAMUEL LATHAM MITCHILL*, M.D.F.R.S.E.

Professor of Chemistry, Natural History and Agriculture
in the College of New-York.

THIS is the air mentioned by Priestley (ii. Exp. and Obs. 54, &c.) under the title of *Dephlogisticated Nitrous Air*. He discovered it by exposing nitrous gas to iron, whereby that aeriform fluid was transformed in about two months to a species of gas of a very remarkable kind, “ which keeps up combustion “ naturally and freely in a candle immersed in it, but “ is at the same time highly noxious to animals, and “ destroys their life the moment they are put into it ;” whereas it commonly happens, that animals can live tolerably well in air so vitiated by inflammation, that a candle will no longer burn in it.

He obtained this air too by applying heat to a dissolution of iron in nitrous acid, after the production of nitrous gas was finished ; in a direct process by the dissolution of zinc and tin in nitrous acid ; by exposing nitrous gas to a mixture of iron filings and sulphur
f moistened

moistened with water, and to hepar sulphuris; and likewise by iron and solution of copper in the nitrous acid.

He found, that when phlogisticated air (nitrogen or azotic gas) and dephlogisticated nitrous air (gaseous oxyd of nitrogen or azote) were mixed together, it was an easy matter to separate them by means of water; for the latter, by reason of its readier miscibility with water, will combine with that fluid in a very pure form, while the former will remain unabSORBED.

Priestley's speculations concerning the constitution of this air are attended with all the difficulty which besets the doctrine of phlogiston; and its true composition seems not to have been detected until since he wrote.

In the second number of the *Recherches Physico Chymiques*, published at Amsterdam, an account is given, which confirms the facts related by Priestley. For this gaseous oxyd was obtained by exposing nitrous gas for three days over water to the action of wetted iron filings; by the subtraction of part of the oxygene of nitrous gas; by the moistened sulphures of potash and soda; by the muriate of tin; and by ammoniac with a bit of copper in it: it is related also, that solutions of iron and tin in extremely diluted nitric acid, affords this gaseous oxyd, and that the nitrate of ammoniac heated after mixture with three times its quantity of sand, gives toward the end of the operation a large quantity of it.

One of the most happy discoveries of modern science is that of the *principle of acidity or oxygene* being capacitated, to afford products possessing very different qualities, by combining in greater or less proportion with the same radical. Thus, for example, azotic or nitrogen gas constitutes $\frac{73}{100}$ th parts of our atmosphere. Simple nitrogen, the base of this gas, is capable of combining with the principle of acidity as well as the matter of heat (caloric) in four distinct proportions. Azote, in its highest degree of oxygenation, forms *nitric acid*; in its next, it constitutes *nitrous acid*; in a lower, *nitrous gas*; and in the fourth
or

or lowest degree it affords the compound, now more particularly under consideration, *the gaseous oxyd of azote, or nitrogene*. We hence know with the utmost certainty that oxygene, or the base of respirable air, which composes the remaining $\frac{27}{100}$ th parts of the atmosphere, is in many processes blended with azote in various quantities.

In the gaseous oxyd, produced by the union of these two atmospheric ingredients, the portion of the acidifying principle combined with its nitrogene base is too small to manifest the smallest degree of acidity; not even so much as to have any effect wrought upon it by exposure to liquid caustic alkali, nor muriated tin; and in its pure state undergoes no shrinking, decomposition, or change, by mixture with the atmospheric fluid, nitrous gas, or vital air.

The properties of this oxyd are so singular and extraordinary, that Priestley affirms, (ii. 55.) at the time of his first publication on the subject, *he should not have hesitated to pronounce them impossible*; to wit, a power at the same time of supporting flame, and of extinguishing life. This surprising quality is however doubtless owing to the difference in the attractive force which its oxygene exerts for hydrogen in the one case, and for carbone in the other; for it is known, that by mixing the gaseous oxyd of nitrogene with carbonated hydrogen gas, the carbone is precipitated from its solution. Hence it appears, that the attraction for charcoal is much weaker than for hydrogen, and that although carbone may be made to burn in the gaseous oxyd, hydrogen is the substance for which it has the closest affinity. And we can now readily conceive how the hydrogen of the candle may in an especial manner contribute, by attracting the principle of acidity from the gaseous oxyd, to keep up the inflammation, wherein some part of the charcoal may likewise, though in a secondary way, be converted to carbonic gas. It may be understood too, wherefore it is not capable of sustaining life. There are two important purposes answered by animal respiration; the one to furnish oxygene to the phosphoric,

phoric, sulphureous and carbonic matter of the blood; the other to carry off its surplufage of charcoal by means of the lungs. Now the gafeous oxyd has lefs action upon phosphorous and fulphur than it has upon charcoal. Hence it is a very natural conclufion, that in ordinary breathing the gafeous oxyd does not only not yield its principle of acidity to the blood in the pulmonic circulation, but at the fame time does not fufficiently attract carbone from the venous portion of it; whence it comes to pafs, that an animal inhaling an air, contributing to neither of thefe falubrious proceffes, muft speedily die; its blood being both in a difoxygenated and fuper-carbonated ftate: hydrogen alone being the ingredient in phlogiftic operations which readily attracts its oxygene from the gafeous oxyd.

The proportion of oxygene entering into gafeous oxyd is $\frac{37}{100}$; the other 63 parts being nitrogene; whereas in nitrous gas, the oxygene constitutes 68 parts of the 100.

On reflecting upon thefe facts, it occurred to me this fubject merited confideration in feveral other points of view: as,

1. Since this remarkable aeriform product is afforded by a variety of artificial proceffes, whether it is not generated likewise by a natural operation in the decay of organized bodies, containing both nitrogene and oxygene?

The hiftory of nitre throws great light upon this query. That fubftance is known to confift of nitrous acid joined to potafh. It is ufually formed during the decay of animal and vegetable bodies, and by a fpon-taneous procefs, is produced from their ruins. We are quite fatisfied that azote and oxygene entered into the compofition of thofe bodies when alive, and have gone into new combinations on their difengagement by death. One of thefe recent compounds muft be nitrous acid, conftituting by junction with a faline bafe, the nitrate of potafh. Thus, the theory of the formation of falt-petre neceffarily prefumes the generation of nitrous acid from two of the elements dif-engaged from organic texture. And as azote, the
radical

radical of the acid, is especially abundant in animal bodies, and as Lavoisier (i. *Traite elementaire de Chimie*, 155) says, *favorise merveilleusement la putrefaction*, wonderfully promotes putrefaction, there is little difficulty in conceiving, both how in such circumstances it attracts the acidifying principle, and afterwards attaches itself to the alkali.

But further than this, the authority of Mr. Becker (Notes to Bergman's *Elective Attractions*, 327) has been advanced in favour of the production of nitrous acid without the aid of the putrefactive fermentation at all. He found nitrous acid in the urine of cows, which had been eight days exposed to the sun. He mixed some of the soakings of a dunghill with a ley of burnt sheep's dung and chalk in powder. The mixture began to ferment on the following day, and on the fourth, the internal commotion having ceased, he found at the bottom of the phial regular chrystals of prismatic nitre. He ascribes the nitrous acid not to a process going on in the air, but brought about by the *excretions of animals*. On examining the earth of stables and cow-houses, he found its lixivium to yield prismatic nitre, while that of the dung would afford only small chrystals, which required an addition of nitre in order to be reduced to a prismatic form; and he declares he can attract salt-petre at pleasure, in the course of three days, from the earth of stables and cow-houses, by using for saturation well-purified pot-ashes.

In the production of salt-petre, the putrified substance, if of the animal kind, affords little more than the nitrous acid. This was known to BOERHAAVE, who (i. *Elementa Chemie*, 44) says, the nitrous quality of the earth is derived from the excrements of animals and their putrified carcases, particularly such as do not use sea-salt, as birds, which, by the addition of the ashes procured from the burning of plants and of quick-lime, forms salt-petre, &c.

This fact of the animal origin of the nitrous acid is confirmed by the testimony of MACQUER, (iii. *Dictionnaire de Chimie*, 18) who declares, that in the putrefactive process which affords nitrous acid, animal

mal substances have a decided preference ; so that, in order to make chrysalizable salt-petre from substances purely animal, a quantity of the vegetable alkali must be added ; while the salt-petre produced in the putrefaction of vegetables alone is *naturally* found to be furnished with that quantity of fixed alkali which is necessary to form good nitre.

To this may be added the authority of FOURCROI, (ii. Leçon Elementaires, &c. 842) who speaks of *acidity* as one of the early signs of animal putrefaction ; and of the proper putrid exhalation as not to be confounded with carbonic acid, (fixed air) hydrogen gas, (inflammable air) which are at the same time let loose, nor with the phosphoric emanation which sometimes glows on the surface of corrupting animal solids. When to all this it is subjoined, that on analyzing the soil taken from the bottoms of graves where human bodies have putrified, it has been found, though having no communication with the external air, to be highly charged with nitrous acid, the animal origin of this acid is put entirely out of doubt.

We hence see the reason why the French chemists have advised the use of wood ashes to neutralize the redundant nitrous acid in their salt-petre works, and have even gone so far as to recommend foreign potash as greatly preferable. On this subject, the valuable paper of Mr. MASSEY may be consulted in the Memoirs of the Manchester Society, where it is made to appear, that earths become impregnated with nitrous acid during the putrefaction of animal substances, but will not afford a crystal of nitre until the vegetable alkali is added.*

In

* It is a pity, that notwithstanding all these things, the French Academicians who framed the new Nomenclature, suffered themselves to retain the words *nitrous acid*, *nitrous gas*, &c. which seem to me to be very improper, and to be quite as subject to objection as the terms *azote* and *nitrogene*, for their radical. The mind becomes unhappily impressed with the notion of those products being derived from nitre,

In these several ways we find nitrous acid afforded by the putrefaction of animals themselves, and by changes in their excretions. Now nitrous acid differing from the gaseous oxyd barely in the degree of oxygenation, there is no difficulty in comprehending that if there was in any instance a spontaneous formation of the former, there would (*a fortiori*) be a more easy and frequent production of the latter.

And here it happens that the very thing which reason seeks for, nature affords. That particular gas, described by Mr. St. John (Preface to Method of Chemical Nomenclature, xi) as produced at certain times during the putrefaction of human bodies in dissecting rooms, and as being a most active and dreadful poison, is in all probability the very aeriform product which is the subject of this memoir. That exhalation is not only incapable, in its concentrated condition, of sustaining life, but, like the gaseous oxyd, though it may be rendered less injurious by dilution, does not however change its original virulence in the least, by the presence of the atmospherical

whereas the fact is, nitre derives its origin from this *animal acid*. Had I been a member of that committee of the academy, I should have proposed to derive the name of the radical from the Greek verb *σπρω*, *putrefacio*; to call it *σπρωλον*, *putridum*; and have made the Nomenclature stand thus:

1	2	3	4
Septon; instead of azote of nitrogene.	Septous gas; instead of azotic gas or nitrogene gas.	Gaseous oxyd of septon; instead of gaseous oxyd of azote or of nitrogene.	Septic gas; instead of nitrous gas.
5	6	7	
Septous acid; instead of nitrous acid.	Septic acid; instead of nitric acid.	Septate; Septite, &c. &c.	

and then the original of the thing being always suggested to the mind in the phraseology, truth would have found a more ready reception, and no such difficulty interposed as now besets us, prepossessed as we are with the notion, that the nitrous is a *mineral* acid. For it should be remembered, that although it is obtained from nitre, a salt classed among the mineral substances, yet it was produced by animal putrefaction before the nitre was formed.

rical fluids; and, like the gaseous oxyd too, it is not remarkable for any fœtor or particular badness of smell; both of them differing entirely from the loathsome and nauseous odour proceeding from dead bodies in a less dangerous state of corruption.

The deleterious production, so particularly mentioned by Mr. Fourcroy, in his report on the removing the Cimiterie des Inuocens at Paris, and now and then fatal to the grave-diggers, appears to be a gas of precisely the same origin and qualities, and as in the former instance, is generated in the abdomen.

The gaseous oxyd of nitrogene in these instances is always, as far as observation goes, of local origin; and seldom spreads very far in form sufficiently condensed to do mischief. In large cities it is generally most abundant, by reason of the greater collection, along some of their streets, sewers, wharfs, docks, &c. of those materials which afford it; and on account of the difficulty of ventilation in certain lanes, yards, and alleys, which allows the noxious vapour to settle there. In few instances that I have heard of, has it extended over a large tract of country; in the greater number of cases it invades but a limited part of a large city, and that only, when a temperature of the weather, between 75 and 85° of Fahrenheit's scale, favours the formation of the oxyd.

When applied to a living body, fresh and strong on its first formation, it produces violent inflammation and ulceration of the fingers or hand which come in contact with the body from which it proceeds; or drawn into the nostrils, it excites alarming tumefaction, with heat and pain in the fauces and nares; or, if inspired fully into the lungs, it brings on instant death.

2dly. If the first question is satisfactorily decided in the affirmative, where large masses of animal and vegetable matter, in hot seasons and confined places, undergo resolution into their constituent parts, and form new combinations; then is it not presumable that gaseous oxyd may be extricated from similar materials by like causes, occasionally, in the alimentary canal, or *primæ viæ* of human bodies while alive?

For the support of animal life, it is necessary that supplies of food be, from time to time, received into the stomach. The ingredients of diet are of the animal and vegetable kinds, and consequently contain all the materials, after their introduction into the body, that are proper to similar substances out of the body. And were it not for the mixture with saliva, gastric liquor, pancreatic juice and gall, these alimentary matters would, from the operation of constant heat and moisture undergo putrefactive alterations in the stomach and small intestines. By the operation of these animal fluids, the nutritious part of the aliment is dissolved, and prepared for undergoing the process of animalization. For it is to be remarked, that no living thing in the perfectly healthy state exists in the animal stomach; the destruction of life, even in oysters, fishes, frogs, &c. swallowed entire, being a preparatory step to their conversion into nutriment; and worms and other animals infesting the guts, being enabled to live there only by possessing a constitution capable of counteracting the digestive process.

Nobody has affirmed, that in the animal intestines the fluids are endued with animation, any more than the aliment they contain. Our reasoning then concerning the whole contents of the first passages, cannot be governed by the laws which regulate animated systems, but must proceed according to the rules governing the decomposition of organic bodies in such circumstances. Chemical investigation here meddles not with living nerves and fibres, whose functions are not to be interpreted by its aid, but limits itself to the watching into what new forms the inanimate parts of plants and animals are changed after introduction into the belly; a subject on which it is certainly competent to decide. It has been considered, that in ordinary cases, the solution of food in the gastric fluid regularly takes place, and the discovery has been acknowledged to be one of the happiest which physiology has to boast of. Beyond this, our inquiries are very little satisfactory; and

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the intestines, though so essential to health, and so frequently the seat of disease, have, in the midst of much curious research, been strangely overlooked. If, in consideration of their containing inanimate substances prone to undergo the putrefactive process, it can be shewn, that the causes usually preventative thereof are, during certain seasons, suspended or weakened, then it will be evident that changes may take place within the intestines, correspondent to those which go on without them, and that similar productions will flow from the one which are known to characterize the other.

Sydenham, (continual fever of the year 1661 and seq.) says, "he would give an emetic in the beginning of that fever, that the sick might be preserved from those dreadful symptoms that *arise from the filth of those humours that lurk in the stomach and neighbouring parts, &c.*" and seems to have a good general idea of the noxious quality which the contents of the guts sometimes possess. In his account too of the pestilential fever and plague which raged in London in 1665 and 1666, he enumerates "violent vomitings, a pain about the region of the heart, as if it were oppressed, and a burning fever" among the earliest symptoms.

Huxham, (Essay on Fevers, chap. viii.) describing the symptoms of the fevers which he terms putrid, malignant, and petechial, mentions, that together with "head-ach and giddiness, *nausea* and *vomiting* are much more considerable than in the slow nervous fever, *even from the very beginning.*"

In short, in the collected opinions of those physicians, whom Mr. Howard consulted on the plague, as prevailing in the south of Europe and in Asia, (Account of Lazarettos) dryness of the tongue, *vomiting, hicough, nausea*, loss of strength, and fever, are enumerated among the *first* symptoms.

Indeed, the observation of any physician of much practice, in complaints of these kinds, as well as in the yellow fever, bilious fever, &c. is sufficient in satisfying him, without recurring to written authorities,

ties, that the diseased state of the alimentary canal is not only one of the first group of symptoms that attract his notice, but is of the most troublesome and dangerous nature too.

It has been doubted what could be the cause of so much disturbance in the stomach and bowels. The disorders incident to these are peculiar to animals, and are derived from the necessity we are under, because of our locomotive faculty, of carrying a quantity of manure constantly within us; on which account our organization in this particular differs exceedingly from the vegetable creation, who have their food brought them, but are under no need of taking the crude mass within them. If vegetables then have no analogous ailments, it must be owing to their inhaling their chyle from their external surface, and the inconvenience experienced by animals be referred to their taking into their bellies a good deal of matter beyond what is convertible to nourishment, and carrying the fœculent collection about with them. Our locomotive power is indeed a capital endowment; but the diseases of the alimentary tube, with their endless train of symptoms and consequences, are the immense price we pay for it. Upon this view of the comparative structure of plants and animals, it would seem that we should examine the kinds and qualities of food in the latter, in order to ascertain the causes of those complaints to which they are peculiarly subjected. And here it happens, we have a most striking and instructive fact to guide us. Mr. Verdoni declares, that “the Greek Christians in Smyrna, during the season “in Lent, when they *eat only vegetables*, are very seldom attacked by the plague; while *among those who “eat flesh* the contagion makes great havock. Hence “the best means of prevention are to eat moderately, “and *not at all of animal food, &c.*” And I believe a multitude of facts tending toward the same conclusion could easily be collected.

The cause of plague, and consequently of other analogous fevers, would seem to reside then in the animal part of the ingesta; and so, according to the

theory, it ought ; for from that source should flow the azote, or base of the gaseous oxyd, the cause of the most alarming and dangerous symptoms accompanying this class of distempers.

It is a fact worthy of particular regard, that the two cases of contagion caused by the gaseous oxyd, one produced from external causes, contaminating the air, and affecting the lungs and respiration, and the other arising from circumstances existing within the body itself, and disturbing the stomach and intestines, should have been distinguished by Hippocrates. In his book, *De flatibus*, he with great sagacity, notes the “*aer*” operating without the body, and the “*spiritus*” acting within, and both of them causing fevers ; to the former he ascribes *epidemics*, where, from a change in the qualities of the air, many persons are incommoded, as in pestis ; to the latter, he attributes *sporadics*, where from bad diet flatulencies proceed, creating disturbance in the whole animal frame.

There are four facts concerning the alimentary mass which impress the mind with the belief of the actual extrication of the gaseous oxyd in the primæ viæ. First, The production of a gas is manifested by tension, oppression, and belching, as unequivocal signs denoting wind, distending the bowels. Secondly, On some occasions there is a vomiting of *black* matter, which consists frequently of extravasated blood ; this tends to determine the gas to be of such a sort as to afford no oxygene to the blood, which therefore requires no floridity. Thirdly, The existence of *green* stools, in certain stages of the disease, point with more certainty to this oxyd as their cause, particularly since it has been observed to tinge both water and glass of a remarkable green colour. And fourthly, There is no instance related of persons afflicted primarily with this malady, except flesh-eaters.

A source of poisonous effluvia thus seems to exist in our own bodies, sufficient to disturb the animal machine excessively, and even to effect its destruction. There can hardly exist a doubt, that the great quantities of butcher's meat, poultry, and fish which we consume,

consume, are the materials which chiefly afford the gaseous oxyd, and that in our choicest viands we swallow down the principle of sickness and decay. The flesh of slaughtered animals, prone in hot weather to enter upon an incipient putrefaction, may in some cases not meet with a sufficient corrective in the stomach, and pursuing its propensity there, may go on to rot and rot, and induce by its mischievous productions the most calamitous consequences.

It has been long ago doubted, by considerate and humane persons, whether man was justifiable in preying upon his fellow animals. The authority of revelation, added to the make of his teeth, and the conclusions of reason, have decided in favour of his right. But how far this indulgence, or luxury, (for animal food can scarcely be called a necessary of life,) may be gratified, is left wholly undetermined. Our own experience alone, of the wholesome or pernicious effects resulting from its use, must guide us. Judging by this, there appears a physical certainty, that we devour more of it than does us good; nay, that in the enormous destruction of animal matter, raised in such abundance for our riot and gluttony, some of the most serious of bodily evils are generated, and these particularly in cities, camps and ships, badly regulated. The causes of such distempers are deeply founded in our state of society and way of life, and as long as we gorge ourselves with animal food, and dwell among its putrefactive recrements, the poisonous gaseous oxyd of azote proceeding therefrom, must be expected to disturb both our respiratory and digestive functions, and be followed by scenes of distress and woe.

3dly. Provided, the oxyd should be produced during the disorganization of the food, &c. in the alimentary canal, what changes will it bring about in the chylipoetic viscera, and what symptoms excite in the constitution at large, particularly in those who at the same time inhale more or less of it into the lungs?

No person acquainted with the mode in which the animal body acquires its heat in the lungs, need be informed,

informed that, in a case where the gaseous oxyd has, in a dilute form, been breathed, and from the situation and circumstances of the patient continues every moment to enter the trachea, the symptoms will be very different from those of a person whose respiration is free from contagion, but has the noxious gas in his bowels merely. It is therefore to be carefully considered, that according to the nature and function of the organ on which the gaseous oxyd exercises its virulence, will there be a variety in the morbid symptoms, though produced by the same cause. If, for instance, the stomach and the intestines are the seat of the gaseous residence, inflammatory symptoms of those parts, with tension of the præcordia, dryness and redness of the fauces, great heat and high pulse may be expected to supervene;—whereas, if the lungs are pervaded by it, the heat will be moderate, the countenance pale, purple, or yellowish, the pulse slow, and the first passages more quiet; while the most violent disease must ensue, when both the lungs and intestines are exposed to its virulence.

1. Let its effects upon the stomach and bowels be attended to.

Costiveness is favourable to the production of this gaseous oxyd, by retaining the fœces an inordinate length of time, and preventing the ready escape of the flatus. Accordingly, it is related, that in the bilious yellow fever of Philadelphia, which prevailed in 1793, (Rush's Account, &c. 52.) “the bowels were generally costive, and in some patients as obstinately so as in the dry gripes; and flatulency was an almost universal symptom in every stage of the disorder.”

From its qualities, as mentioned before, we are at no loss to explain the painful burning which sometimes occurred before any vomiting took place, and the gastrodynia which at times ushered in the disease. Nor, when we consider the irritated or inflamed condition of the parts, can we be at a loss to understand wherefore it seldom appeared without nausea and vomiting, and why that vomiting was sometimes so long continued, violent and convulsive.

The inflamed state of the stomach and duodenum, and other parts of the intestinal tube, in all cases of dissection after death, and the black, gangrenous and mortified spots found thereabout in numerous instances, are just such as might be expected from the operation of a gas so deleterious as the azotic oxyd, which in some cases of high malignancy may be imagined to acquire by union with a larger portion of oxygene than common, an uncommon degree of activity, or *acrimony* as it is called; in its effects, resembling in every particular that condition induced by the oxyd of arsenic.*

The coffee-coloured, grumous and dark matters ejected from the stomach, are probably in a great measure derived from the sanguineous fluid, blackened by contact with the gas, and effused from the vessels ruptured by its erosion or causticity. Some part of them may consist of bile vitiated by the same cause, and of putrid ichor proceeding from the gangrenous spots.

Excoriations of the rectum and external termination of it, correspond to the inflamed state of the superior portions

* It is remarkable what an analogy there is between this oxyd of azote and metallic oxyds. Azote, as well as the metals, in its pure state has little or no chemical operation upon the body: as soon, however, as they become oxydated, they acquire activity; and that this activity is proportioned to the quantity of oxygene they absorb, is sufficiently evinced by the preparations of antimony, arsenic and quicksilver. There is another trait of character in which azote resembles arsenic and some other metals, which is, that they are both acidifiable bases: as by increasing the quantity of oxygene, you change the oxyd of the metal to an acid, possessing powers greatly superior to what it possessed before, so, by giving the oxyd of the gas a larger dose of the acidifying principle, you increase its activity to an extreme degree. There is thus a very strong chemical analogy between the oxyd of azote, and white arsenic. Perhaps azote is a metal. Quicksilver is a metal, maintaining *fluidity* under the common circumstances of terrestrial heat and atmospherical pressure. May not azote be a metal existing in the same circumstances of warmth and weight in a *vaporific* form?

portions of the intestinal canal, and are fairly ascribable to the same cause ; as is also the hiccuping.

In a word, the pain in the sides, and in the regions of the stomach, liver, and bowels, with their hotness and spasms, and with the consequent distress both of body and mind, all indicate the locality of this malady, as well as point to the nature and cause of it.

There is one case which may be imagined to happen, in which the stomach and bowels are disturbed by the gaseous oxyd swallowed with the spittle and the food. Where the oxyd is abundant, it can easily be understood from its disposition to unite with water, that some part of it may attach itself to the fluids of the mouth, and be swallowed ; as also forming a connection with the alimentary mass in the act of chewing, may, together with it, descend into the stomach ; and thus, in either case, produce its harmful effects.

2. Its operation upon the lungs shall be next inquired into.

If a full inspiration of the gaseous oxyd be made, there will be a sudden extinction of life ; and this accordingly accounts for the fact related by Russel, (*History of Aleppo*, p. 232.) and confirmed by other observers, of many persons falling down dead suddenly, when struck with the contagion of the plague.

If a quantity of the same fluid be mingled in such proportion in the atmosphere, as by its dilute state to produce neither immediate death, nor catarrhal affections, then the slow and undermining effect of it, by constant breathing, will be manifested, first in the sighing, anxiety, tossing of the body ; afterwards by languor, faintishness, coma ; and afterwards by the sleep-like and gentle approach of death.

An inhalation of a more condensed or concentrated oxyd will account for the pulmonic symptoms sometimes occurring, give rise to pain and convulsions, and lead to an explanation why, after running a certain length, they should suddenly end in effusions of blood or other fluids to stop the respiration entirely.

I am satisfied, from experiments repeatedly made upon myself and others, that the heat of the body and beat of the heart and arteries are, to a certain degree, under the government of the will. This depends upon their connection with the respiratory organs. If, while all the other voluntary muscles are at rest, breathing be quickened by an effort of the will, the action of the heart and arteries will be increased, and so will the heat of the body; if, on the other hand, a person sitting as quiet as possible in a chair, inspires the smallest possible portion of air that he can, without bringing on anxiety, and continues to do so for some time, a thermometer placed in the arm-pit will fall several degrees, and the pulsations of the heart and arteries be exceedingly diminished in frequency and force. I mention these experiments to show how intimate the connection between respiration and the circulation of the blood is in the most healthy state of the body, and how the latter is governed by the former. The heat of the body is nearly, other things being equal, in proportion to the oxygene gas decomposed in the lungs, and so also is the force of circulation from the stimulant quality imparted to the blood. If the air inspired be mixed with a large quantity of non-respirable air; then, though a full inhalation be made, there will be but a small portion of vital air decomposed, and, as in the case of voluntary diminution of the breathing, the heat must be lessened, and the contractions of the heart be more slow and feeble. It can easily be understood then, wherefore in some cases there should be weakness of pulse; in others, no uncommon quickness or frequency; in others again, such slowness that it can be hardly felt. We hence are enabled to understand why the pulse sometimes intermits, and to account for that remarkable slowness, which, when considered in this point of view, indicates extremest danger; while, according to the ordinary way of judging, it has been considered as denoting that there was no fever: and the justness of this interpretation is confirmed by observing, on dissection,

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the blood in the heart resembling, in its qualities, the blood of persons that have been hanged. The coolness of the skin and the coldness of the limbs are in this manner very naturally accounted for.

In certain cases of high malignity, the bodies of patients dead of fever caused by this gaseous oxyd, have been all over disfigured with purple spots, and have even sometimes assumed a blackish hue. Yea, even during life, vibices and blackness are known to make their appearance, and when they do, to be attended with coldness prevailing in the livid parts a day or two before death. These appearances are entirely explicable upon the idea, that the lungs are filled with a species of air, not capable of oxygenating the blood, carrying away its carbone, and imparting heat to the body. The case described by Huxham, in pages 98 and 99, is a very instructive one, and illustrates this doctrine in a forcible manner; as does the case described by Sandifort. (Obs. Anatom. Pathol. 11.)

From a review and consideration of the history of such cases, it would appear there was a *scorbutic habit* of body induced, and that the hæmorrhagies, debility, and prostration of strength, as well as the darkened colour of the blood, and the want of cohesion in the solids, might be all accounted for upon the same principle in fever as in scurvy.

It very soon occurred to me, if my idea was just, that the gaseous oxyd ought, when in a concentrated form, and approaching the state of an acid, to manifest itself by corroding metallic substances. On inquiry, I found facts of that kind on record; for Van Swieten relates, “ that in the plague of Ocza-
“ kow, the *silver* hilt of a sword, which all the time
“ of the plague hung up in a tent, was changed
“ *quite black*; and the instruments which the surgeons
“ made use of were turned as *black* and *livid* as if
“ they had been dipped in *aqua fortis*,” (nitrous acid.) (Comment. in Aphor. Boerhaav. §. 1407.)

Upon discovering this, I became convinced, that if my conjecture was right, a substance so active as
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the gaseous oxyd ought, when applied to the skin of well persons, to excite disorder there, and this I found to be true: for Van Helmont (*Tumulus Pestis*, p. 853.) saw a man, “ who, upon touching
 “ some papers infected by the plague, felt instantly
 “ a pain like the prick of a needle; a pestilential
 “ carbuncle made its appearance soon after on his
 “ fore finger, and he died in two days.” A man who stirred up with his foot the straw whereon the bed of a person sick with the plague had been laid—“ a little while after he felt an acute pain in
 “ the lower part of his leg, just above the foot, as if
 “ the part had been scalded with boiling water; the
 “ next day the epidemis or scarf-skin was elevated
 “ into a large blister, upon breaking which, a quantity of blackish liquor ran out, and, underneath, a
 “ latent pestilential carbuncle was discovered, which
 “ could hardly be cured in a fortnight.” (Van Swieten, § 1409.)

There was another inference from my principle upon which I laid so much stress, that if it had not turned out according to my prediction, I should have given up the whole matter as visionary. This was the effect that air of the kind I had in contemplation should have upon brute animals of the domestic kind. Thus *Sorbait* of Vienna (quoted by the last mentioned author) says, that during the plague, “ *larks* so numerous in Austria during the autumn, where
 “ wholly wanting, so that not a single one could be
 “ met with; and *tame birds kept in cages all died.*” Homer mentions the death of *dogs* and *mules* as the forerunner of the pestilence in the Grecian camp before Troy. (*Iliad* i. 69.) The pernicious and deadly effects of the atmosphere during the plague at Athens, in the second year of the Peloponnesian war, upon birds and beasts, and particularly on dogs, is mentioned by Thucydides* (*B.* ii.) Boccace, in
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* The disputes concerning Epidamnus and Corcyra had for some time agitated the governments of Corinth and Athens. These dissensions, founded chiefly in a jealousy of the growing and encroaching power of the people of

his account of the plague at Florence, "saw with
 "his own eyes, *two hogs* that had rolled about with
 "their snouts, and gnawed some pieces of bread
 "which had been thrown from a poor man's house
 "who

Attica, furnished sufficient pretexts for most of the states of the great Peloponnesus, to join in a confederate war against them. In the 431st year before Christ, the war began between the Peloponnesians and Athenians, and their confederates on both sides. That more vigorous preparation might be made for war, Pericles advised the Athenians to move from their country residences to their chief town Athens. His advice was followed. They sent away their flocks and labouring cattle into Eubæa and the adjacent islands, tore down their houses, and with their wives, children and furniture sorrowfully moved from the open country, where they had been accustomed to live, to their metropolis. Great inconveniences were now experienced by them, especially since that, after repairing the waste committed by the invasion of Xerxes, the inhabitants had established themselves in a most comfortable way of living. After moving, they were obliged to adopt a new mode of life : few had houses ready for their reception : some sheltered themselves with their friends and relations : the greater part were forced to settle in the less frequented quarters of the city, in the buildings sacred to the gods and heroes : and many were even obliged to lodge themselves within the turrets of the walls, or wherever they could find a vacant corner. In short, there was a greater number of people than the city could contain, and after the *Pelægie* was occupied, the *Long-walls* and great part of the *Piræus* were portioned out to them for *little dwellings*. Thus pent up, the Athenians continued accumulating filth and noxious matter among them during the winter and until the ensuing summer, when, on the operation of heat, the gases were volatilized that brought on the memorable sickness, which has been called the *plague of Athens*. The attempt of *Thucydides* to trace it back to *Lybia*, *Egypt*, and *Æthiopia*, is wholly unsatisfactory, and just as groundless as our own endeavours at present to prove *yellow fever* always imported from the West-Indies or some other foreign place. The causes of the plague at Athens, which was, in fact, only a very bad yellow fever, existed among themselves, just as they do among the New-Yorkers and Philadelphians now-a-days. A truth so plain and so important as this is, ought to be candidly received by every citizen of the United States.

“ who had died of the plague, instantly seized with “ convulsions, and died within an hour after.” In *dogs* and *cats* the symptoms of plague have actually been known to appear, shewing themselves in the form of buboes, &c. The *cats* of Philadelphia died in 1793, and it is highly probable their deaths are to be in part ascribed to the gas they breathed.

Again, if the idea I entertained was well founded, the gaseous oxyd ought, when very concentrated, to shew its capability to support flame. The two following facts, though not related with sufficient accuracy or distinctness, are however cases in point, and as far as they go, illustrate and confirm the doctrine in a forcible manner. The first is “ that a lighted candle “ being held near dying persons, a very *livid* vapour “ was seen to issue from their mouths.” The other, the relator says, he frequently observed in the form of a *blue* smoke, as it were, in the rooms where the infected lay. (Van Swieten, §1407.) Now, when these facts are compared with what Priestley describes of a candle burning in the gaseous oxyd with an enlarged flame, by another flame (extending every where to an equal distance from that of the candle, and often plainly distinguishable from it) adhering to it, and in some of his experiments burning *blue*, there appears to be considerable similarity in the cases.

Moreover, knowing that under an atmospherical pressure, which supports the quicksilver in the barometer at 29.84 inches, and in a temperature of 54.5 of Farenheit’s scale, a cubic foot of azotic gas weighed one ounce thirty grains and one half; and of oxygenous gas, one ounce one dram and fifty-one grains: it was presumable that a combination of the two, that is, thirty-seven parts of oxygene united with sixty-three of azote, would form a fluid of nearly the same weight with atmospherical air, or rather heavier, and the probability of this would increase, by considering that a cubic foot of nitrous gas, which contains only thirty-one parts more of oxygene than the gaseous oxyd does, weighs one ounce two drams and thirty-nine grains. An inference from this is, that persons who reside in low situations, where the gaseous oxyd is generated,

or patients who lie near the floors of infected chambers, ought to suffer more than others, by reason of their breathing an atmosphere more loaded with non-respirable vapour, tending downward on account of its weight. This inference from the principle is also conformable to fact, since it is known both in New-York and Philadelphia, the lower parts of the city have been most severely afflicted, and that physicians, friends, nurses, &c. who walk erect in the chambers of the decumbent sick, escape danger, and breathe a tolerably pure air ; while the unhappy patient, lying near the floor, toward which the heavier oxyd settles, inhales deadly gas at every inspiration.

Again, it was clear to me from the little disposition the gaseous oxyd possesses to combine with other bodies, and from its considerable weight, that it might be transported from place to place, in tight boxes or packages of goods, &c. and that on opening these, and taking out their contents, the unchanged gas might be inspired into the lungs, or insinuate itself into the stomachs of such persons as should be exposed to it. This inference from the principle is also conformable to fact ; for upon it depend the instantaneous deaths in some cases ; transported infection in others ; and fevers kindled up in others, from the subtil matter exhaling from such fomes.

Besides, if, from the heaviness of the oxyd, it always has a tendency to the lower parts, then ships, through whose sides it cannot leak out by reason of their tightness, should be very apt to accumulate it ; and this too corresponds with the fact ; sea-vessels being among the chief agents in its production and diffusion, the receptacles of its collected virulence, and the seats of its most destructive ravages. Cellars are noxious for the same reason.

It must be obvious, that the symptoms of these febrile diseases, excited by the gaseous oxyd, are divisible into two classes. Sporadic cases may occur, in which, from its production within the body, the stomach and bowels may chiefly labour, and in these will the symptoms first enumerated prevail, attended with
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high excitement of the system. Endemic sickness may generally be expected, when, from an extrication of the gas in large quantity from some abundant source without the body, the contagion operates upon the lungs, and produces the second class of symptoms, and in these will the pulse be slow, and the heat moderate. The worst cases that can occur will be those, where, both from external and internal causes, the stomach and lungs and skin are attacked at once, and afford a mingled assemblage of symptoms.

There has been much dispute about the production of contagion, whether from animal or vegetable matter. The controversy seems to me to be a trifling one. It is understood from analysis, that the bodies both of plants and animals are composed of the same elements or principles, varying in their proportions, structure, &c. It is known, for instance, that oxygene, which constitutes $\frac{37}{100}$ th parts of the azotic oxyd, is very plentiful in most vegetable substances, and that some of them also contain a portion of azote, the ingredient forming the other $\frac{63}{100}$ th parts. In such cases there can be no question, that the oxyd might be produced during their decomposition. It is likewise known, that animals contain a very great proportion of azote, and mostly a moderate quantity of oxygene. There can be hardly a question then, that the oxyd might be generated from decaying substances of this sort. But as the one substance is highly charged with oxygene, and the other with azote, the mixture of the two seems most likely to afford the greatest amount of oxyd, and this, I believe, is agreeable to fact. Pure animal matter will therefore perhaps be less likely to afford this oxyd than a mixture of it with vegetable. This explains why the stomachs of living persons, containing commonly a mixture of the two kinds of food, and the abdomen of dead bodies are so prone to the production of it; and why slaughter-houses, tan-vats, currying-houses, works for making glue and Prussian blue, the horner's business, oil-shops, and manufactories of soap and candles are not remarkable for generating contagion. There is very little acrescent
vegetable

vegetable matter employed there, and consequently the gaseous oxyd is sparingly formed. On the other hand, in vinegar-cellars, wine-presses, cyder-mills, and other places where much unmixed vegetable matter of the oxygenous kind is accumulated, no inconvenience arises, as there is little azote to join in producing the oxyd. I see, however, no improbability in the idea, that independent of animal and vegetable matter at all, there may exist in nature some mode of combining oxygenous and azotic airs. But I know of no such process at present.

This inquiry has brought contagion home to our doors, and traced it to its seat within our bodies. Henceforth much of the labour employed in tracing the origin of fevers in foreign places, and their introduction in ships to our own ports, may be considered as superfluous.

Causes enough exist among ourselves, at certain times, to engender the most noxious vapours. The study of the production, and diffusion of these from domestic and internal sources should most assiduously engage our attention. In doing this, we shall be employed in earnest, in counteracting as well as detecting this wide-spreading and terrible evil.

On this head I shall first speak of prevention, as it respects the stomach and intestines.

According to the theory delivered, the persons who live on vegetable food, or keep a lax belly, ought to have no disorder, or a very slight one. This conclusion is confirmed by facts in abundance. The advice given by the Arabian physicians to prevent the plague, enjoins the repeated use of acid fruits, as pomgranates, Seville oranges, lemons, tart apples, &c. but above all wine-vinegar in small quantities, &c. (Mead on the Plague, chap. ii.) Doctor Wade has established the efficacy of a vegetable diet, (Rush on Yellow Fever, 334.) and of water as a drink, as the best means of preventing the yellow fever in a hot climate. Mr. Howard has borne testimony of the benefit of low diet as a preventative of the plague; and it is reported, that during the famous plague de-
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scribed by Thucidydes at Athens. Socrates the philosopher preserved his life by means of slender diet, as did Justinian at Constantinople in a similar case, by his abstinent way of living. The avoiding of animal food, adhering to a low diet, and taking laxatives, was doubtless one of the means of preserving the life of Dr. Rush, during the late calamity in Philadelphia; and what may serve as a host of facts, in a word, it is related by Bontius, that the plague has never yet shewn itself among the natives (rice-eaters) of the East-Indies. Speaking of China, Dr. Mead says, "We have no instance of the plague that was originally bred in that country."

Here then, we have evidence of such an extensive and conclusive kind, as to satisfy even the sceptical mind concerning the ease and possibility of prevention. By avoiding animal food azote is kept out of the stomach, the destructive gaseous oxyd is not formed, nor are the inflammatory torments of the bowels felt. By keeping an open belly, the plan of securing the health will be promoted, and no detention of feculent matter give rise to flatulency and oppression. I doubt whether the metallic rod will more securely guard us from lightning, than vegetable food preserve us from pestilence.

As to the second head of prevention, as it regards the production of the gaseous oxyd in quantity sufficient to contaminate the air and injure the thoracic viscera, it forms so interesting a branch of general police that it is needless to remark any further upon it than to say, while puddles of putrid nastiness, and piles of reeking dung are incessantly exhaling their poisonous steams, that magistracy consults very imperfectly the public health, which neglects the removal of such common nuisances. The city, as well as the individual citizen, wants a cathartic now and then; and by this plan, and by changing animal for vegetable food in the summer time, a world of sickness and mortality might be prevented.

In the case of gas already produced, and pervading the rooms of a house, or the houses of a neighbourhood,

hood, as it is formed by a chemical process, it may be very rationally demanded, whether by some chemical operation the gaseous oxyd may not be decomposed? It has been already stated in the history of the substance, that it resisted decomposition by sulphur, phosphorus, and caustic alkali entirely; was but feebly attracted by charcoal; and that hydrögene was the only substance as yet known, having a powerful affinity to it. In what form this can be applied so as to separate the oxygene from the oxyd, and leave the naked azotic gas in the possession of its ordinary harmless qualities, is a field for curious and useful inquiry.

Long ago has it been remarked, that our vices were the parents of our misfortune. Never perhaps was sentiment more sorrowfully verified than in the present instance. Our luxury and festivity doom the inhabitants of air, earth, and water to death; and it seems as if, in revenge for our cruelty, this tormenting spirit had arisen from their graves to plague us.

HITHERTO we have been ignorant of the precise nature of contagion; but since we are become acquainted with its production and composition, it is very much in the power of individuals to guard themselves against it, and for magistrates to protect cities from its ravages. To what extent the principle now started may be carried in explaining other diseases, is not easy to imagine. One can hardly suppress the conjecture, that the same poison which in a costive habit of body causes inflammation of the stomach and dreadful fevers, will in a lax habit occasion cholera or diarrhoea, or in case the large intestines be obstructed, terminate in dysentery. How far it may, when operating on the lungs, concur in producing influenza and scarlatina, is an interesting question. And this is particularly worthy of our notice, from the reason and analogy of the thing, independent of the very remarkable and impressive fact related by the elegant and judicious author of the account of the yellow fever in Philadelphia in 1793, who tells us, (p. 6.) that cholera, remitting fevers, dysentery, influenza,

fluëza and scarlatina were the immediate forerunners of the disorder he describes; and that “in the course of a few weeks (p. 89) they all disappeared, or appeared with symptoms of the yellow fever; so that after the first week in September it was the solitary epidemic of the city.” The case of the girl immediately following this quotation proves the proposition I am contending for to a demonstration. There is reasonable subject of inquiry too, how far in phthisis in hot climates, and scrophula, may be derived from a like source.

The connection of this fever with other complaints is strikingly exemplified in the following narrative: (Anson’s voyage, fol. p. 131.) But (speaking of scurvy) says Mr. Walter, “it is not easy to complete the long roll of the various concomitants of this disease; for it often produced putrid fevers, pleurisies, the jaundice, and violent rheumatic pains, and sometimes it occasioned an obstinate costiveness, which was generally attended with a difficulty of breathing, &c. &c. At other times the whole body, but more especially the legs, were subject to ulcers of the worst kind, &c. &c.” The evidence of analogy, too, strongly favours the opinion, that other contagions and poisons may consist of the same materials, varying but in their proportions, or in some unimportant circumstance, and that the virus of syphilis, small-pox, and measles, and of the spider, rattlesnake, and other venomous creatures, as being all of animal production, may consist in the main of azote and oxygene, combined perhaps with some other ingredient; and there is high probability that marsh miasmata will be found little else than a similar compound. The ichor of cancer and other corroding ulcers is very probable pretty much the same thing. The disease of rabid animals, and the dread of water, and other miserable symptoms consequent upon their bites, may very probably receive some light from this source; and so perhaps may fibbens, yaws, and leprosy.

We have considered already what varied symptoms may be caused by the same matter operating upon

different parts of the animal frame. In all probability much of the difference observable in the operation of different poisons, arise from the sensibility, irritability, structure, and function of the part to which it is applied. This idea at least seems to be countenanced by what we observe in the syphilitic virus, which, when applied to a secreting surface, causes gonorrhœa; to a dry one, chancre; to a glandular surface, bubo, &c. Who knows but a similar exciting cause may, by operating upon the constitution, in one way produce continued, in another remittent, and in a third, intermittent fevers, which in reality differ from each other less in their causes than in the particular part of the body to which this cause is applied? The difference of the several fevers brought on by this gaseous oxyd being chiefly connected with the viscus or function injured by its action, it is to be understood, that if the liver is invaded, this may induce according to circumstances an impeded secretion of bile, and then there will be a fever without yellowness, or an obstruction of the gall-ducts, when, from an absorption from the secreted fluid, there will be yellowness tinging the eyes or skin, or a vitiated secretion, appearing in the form of a green or brown matter vomited up. In like manner, when the lymphatic system is the seat of its action, it may cause buboes in the glands; or when the skin is beset by it, carbuncles, sores, and miliary and petechial eruptions may break out. So likewise in the mouth and fauces aphthous ulcers, and erysipelatous inflammation, a spreading perhaps of the original malady in the stomach, may all derive their origin from the same cause.

This method of considering contagions is entirely conformable to the simplicity of nature. The assignment of a multiplicity of causes, to account for particular phenomena, always betokens a backward state of knowledge. The business of science is to generalize facts, to class phenomena under distinct heads, and show their dependance upon a common principle or cause. Accordingly, in the progress of human reason, polytheism has yielded to the conviction of the existence

tence of *one* God; the intricate and seemingly opposite phenomena of matter and motion have been referred to one general law of gravitation; the puzzling and diversified appearances of electricity have been reduced to a few plain rules; the multitude of facts concerning light and colours have been in like manner arranged into a scientific form; and both the *rainbow* and the *telescope* bear witness to the simplicity of optics. The fluids composing our atmosphere have been analyzed, and the influence of these, and of many occasional combinations of other substances into gases, upon life and health been investigated to their principles. Contagion alone has remained a subject for doubting and guessing; a dismal somewhat, whose exact origin was unknown, and whose operation seemed capricious or unaccountable. This, I trust, will now, like other agents in creation, be found to have its laws of production, diffusion, and action, which are steady and unvaried in their nature, as well as simple and easy to be comprehended.

I was going into the practical considerations and directions resulting from the principles laid down; but the subject was so extensive, and materials flowed in upon me so fast, that the work would very speedily have extended far beyond the bounds I had now prescribed to myself; and impressed as I was with the extensive and beneficial application of this doctrine of contagion to every place upon earth where it is generated, and to every constitution upon which it acts, I felt a deep concern to make it public as soon as I conveniently could.

APPENDIX.

N^o. II.

On the use of the NITRIC ACID in Medicine,
by Mr. W. SCOTT, Surgeon in service of the
Hon. East-India Company, Bombay.

The following attempt to extend a little the limits of the
Healing Art, is inscribed as a tribute of respect to the
character of Doctor James Anderson, Physician General
of Madras.

IN August 1793, I employed myself for some time
in making experiments on the bile, a secretion that
is connected in a great degree with many of the
diseases of this country. I wished to unite some of
the calces of mercury, with the resinous matter of
that fluid, for I imagined that I might discover some
chemical affinity between those substances, and be
able to see by what means this metal is so singularly
qualified for removing obstructions* of the liver.

I had collected for experiment a quantity of the
resinous base of the bile of a buffalo, which I had
separated very carefully from its soda, and from the
lymphatic matter with which it is united. I had
put a drachm or more of this substance into a vessel,
to which I added about half of the same weight of
the red calx of mercury, with ten or twelve ounces
of water. On heating the whole together, I was
surprised to observe that the base of the bile became
remarkably more soluble in the water. I cannot say
that

* I have used the word obstruction to express the chronic
disease of the liver so common in this country.

that I observed the red colour of the calx in any great degree altered, but it is known to retain its brilliancy with different quantities of oxygenet. I filtrated this bitter solution which deposited the base of the bile, as the water evaporated in the ordinary heat of the atmosphere. I shall at another time consider this subject with a little more attention.

M. Fourcroy has observed, that water dissolves a small portion of the base of the bile. In this experiment a considerably larger quantity was taken up than water could have dissolved, which I attributed to the oxygenation of the resin, by the pure air of the calx. I had some reason to think, that obstructions of the liver do often consist of a deposition of the resin of the bile, which I now began to suppose, might be rendered soluble in the animal fluids, by the pure air of the mercurial preparations that are given for the disease. I have seen livers on the dissection of the dead, of a pearl colour, and much enlarged, which I suspect were composed in a good measure, of this resinous matter. I have even found it from accurate trials in a considerable quantity in the substance of a liver, that was apparently without disease: Is the well known effect of new grass, in dissolving the biliary calculi of the gall bladder, that cattle get in the winter time, to be accounted for from the pure air of green and acedent vegetables?

It is acknowledged, that all the calces of Mercury which are used in medicine, contain a quantity of pure air, but I know of no direct experiment having been hitherto made, to prove that the effect of mercury in diseases of the liver or in other maladies depends on this principle, and not on the metal itself. The experiments that I had made on the base of the bile, inclined me to wish, to take myself a quantity of pure air united to some substance, for which it has no great attraction. I reflected on the different ways that are employed by chemists to oxygenate inanimate matter; for I believed, that the same chemical attractions

† See experiments by Van Mons on the red oxide of mercury.

tractions would produce a similar effect in the living body, although they might be disturbed in their operation, by the vitality of the machine, and the variety of the principles of which it is composed.

The nitric acid as may be supposed, was one of the first substances that occurred to me as fit for my purpose, for it is known to contain about four parts of vital air, united to one of azote, with a certain proportion of water. These principles can be separated from each other, by the intervention of many other bodies, as chemists find every day in their operations. I was led besides to give a preference to the nitric acid from observing, that it dissolves very completely the resinous base of the bile: I have since found that the celebrated M. Fourcroy had made the same observation before me.

Before I began to take the nitric acid, I consulted all the accounts of it that I could procure, with the view of learning something of its effects on the human body. The result of this inquiry was but little satisfactory, for I only found that it had been given as a diuretic in very insignificant quantities, or recommended in general terms, where the mineral acids are supposed to be useful; I did not think myself warranted to administer it to others from such imperfect information, but I resolved to take it myself, and I thought I was particularly qualified to determine its effects, as I had reason for a long time before to complain of my liver.

In September 1793, I began to take the nitric acid: I mixed about a drachm of the strongest that I could procure, with a sufficient quantity of water, and I was happy to find, that I could finish that quantity in the course of a few hours, without any disagreeable effect from it. The following is the Journal that I kept of myself at the time.

11th September, 1st Day.—Took at different times about a drachm of strong nitric acid diluted with water. Soon after drinking it, I feel a sense of warmth in my stomach and chest, but I find no disagreeable sensation from it, nor any other material effect.

2d.—I have taken to-day a considerable quantity of acid, diluted with water, as much as I could easily drink during the forenoon.

3d.—I have continued the Acid: I feel my gums affected from it; and they are somewhat red and enlarged between the Teeth. I slept ill, but could lie for a length of time on my left side, which from some disease in my liver, has not been the case for many months before. I perceive a pain in the back of my head, resembling what I have commonly felt when taking mercury.

4th.—My gums are a little tender: I continue the acid as before. I still find a pain in my head and about my jaws, like what arises from mercury. I perceive no symptoms of my liver complaint.

5th.—I have taken the acid, and always feel an agreeable sense of heat after drinking it. I spit more than usual.

6th.—I continue the acid: I observe my mouth forer to-day, and spit more.

7th.—I think I am now sufficiently oxygenated. I feel my mouth so troublesome, that I shall take no more acid.

From this time my mouth got gradually well, and I found my health considerably improved.

I now began to suppose that I had discovered a remedy for that chronic disease of the liver, which is so much more common here than the acute hepatitis. I thought that it might in some respect be preferable to mercury, as it did not appear to produce the inconveniences that arise from the use of that metal. I have given it since to a number of people who had taken mercury for hepatic obstructions, without being effectually cured; and I have found it in many cases produce the most agreeable consequences. If it were proper on this occasion to be more particular in detailing the cases, in which I have administered this remedy, I believe that I could make it very probable that I have not been deceiving myself. In the acute hepatitis I have hardly employed it, for where the life of a person is in immediate danger, I have thought it my duty to make use of remedies that are established.

I have with the best effect oxygenated several people with the nitric acid, who were much reduced by tedious intermittents. That kind of fever is often connected with a diseased liver or spleen. In consequence I think of this remedy, I have seen them recover their natural colour from a leaden or bilious hue, and regain their strength from a state of long continued weakness. I believe, if given in a sufficient quantity, it would be very useful in the fever of this country, which has been called bilious, or nervous or putrid, and for which mercury appears to be a specific.

I have met with two instances only in this country of diabetes:—They were both natives and in the decline of life; I cured them both by mercury, after many other remedies had been tried:—One of those men had a relapse of his disease, which I removed a second time with the nitric acid. I thought this a satisfactory correspondence in the effects of the two remedies—May they not both be useful in that disease?

The great resemblance that I perceived in myself between the effects of mercury and of the nitric acid, made me anxious to know if the acid would remove the various symptoms of siphylis. In September 1793, it was administered at my desire by my friend Mr. Anderson, Surgeon of the 77th Regiment, to a person who had a head-ach that came on every night, and which had long been suspected to arise from lues. He had taken several courses of mercury on this account, which carried away all the uneasy symptoms, but they as constantly returned after a certain period. On using the acid for about a fortnight, he got perfectly free from his head-ach, and he remained very well for a few months, as was usual to him after mercury.

I have now had a pretty extensive experience of the good effects of the nitric acid in siphylis, and I have reason to believe, that it is not in general less effectual than mercury, in removing that disease in all its forms, and in every stage of its continuance.

I think

I think that in some cases, it has even superior powers, for I have succeeded completely with the acid, when mercury administered both in this country and in Europe for years together, had failed of success. We appear to be able to carry the degree of oxygenation of the body to a greater length by means of the nitric acid, and to continue it longer than we can do by mercury.

A mass of mercury in the circulation produces many disagreeable effects, that make it often necessary to give over its use before it has answered its intention; but the nitric acid may be taken a long time without any material injury to the health, nor are its effects on the mouth in producing inflammation and a flow of saliva so disagreeable as from mercury.

A man could hardly offer to his species a greater blessing than a new remedy against any of the host of diseases that assail us, but the reputation of specifics with the exception of a few instances, has arisen only from the weakness of the human mind. Am I too deceiving myself, and attempting to lead others into error?

As the acid that I distil is not strong, and is of unequal strength at different times, I am regulated chiefly by the taste in giving it. I put half or three fourths of a Maderia-glass full of it in two pints of water, or I make two pints of water as acid as it can well be drank. This quantity is finished every twenty-four hours, taking about a Maderia-glass full only at a time.

I have sometimes removed siphylitic symptoms with the acid in five days; more commonly I think, they give way in a fortnight; but sometimes, though seldom, they continue for twenty days without any apparent relief. I must confess, that in some cases I have failed altogether, but in those cases mercury had long been given to little purpose, the bones were highly diseased and the habit probably of a peculiar kind. I have cured siphylis with the acid under a variety of forms, where no other remedy had ever

been employed, and for above two years I have seen no relapse in those cases. I have administered it against the primary symptoms of the disease, and I have given it for exostoses, for carious bones, for nocturnal pains, for eruptions and ulcers of the skin, and for all the train of misery that is attendant on lues. I have the pleasure to see that several of my friends have begun to use the nitric acid in syphilis and in other diseases: An account of their experience which every body will esteem the most respectable authority, will make the subject of a future paper.

I hope this slight account will induce medical practitioners to try the effect of the nitric acid in syphilis, a disease which in this climate is so frequently the disgrace of their art—Too often the miserable wretch is but worn down the sooner by the very remedies that are called in for his relief.

Quæsitæque nocent artes; cessere Magistri,
Phillyrides Chiron, Amythaoniusque Melampus.

Virg: Georg. III.

APPENDIX.

N^o. III.

*Case of diseased Bladder, by Mr. BAYNTON, Surgeon,
Bristol.*

Dear Sir,

AS the success that attended the treatment of the following disease may be referred to a hint offered in your Treatise on Sea Scurvy, Calculus Consumption, &c. I take the liberty of sending you its history.

On the 14th of September, 1794, in the evening, I was requested to meet a Mr. Lawrence who at that time practiced as a Surgeon and Apothecary in the environs of this city, to *investigate* the case of a person of very robust make and about thirty years of age, who had applied to him a few weeks before for the cure of a Gonorrhæa which he informed me he had treated in the usual way, with injections &c. but that distressing symptoms had been daily increasing and for some days had been nearly as violent as they then were. He complained of a very severe pain and tenderness to the touch about the region of the pubis and along the perineum, and passed his urine with great pain and difficulty by drops, and with it a large quantity of peculiarly viscid mucus that was sometimes transparent, at others bloody, but always so viscid that it was with difficulty washed from the sides of the vessel in which it was received. His pulse were remarkably hard and full and beat 110 strokes in a minute. He had constant tenesmus and had not slept for many nights, by my desire he was bled to the amount of 14 ounces. Twelve leeches were applied upon the hypogastrium and about the verge of the anus.

anus. He had an opening medicine and the following anodyne as soon as the opening medicine operated :

R Tinct : Opii : gutt : xL Vin : Antim : gutt : xxx
Syr : Papav : Albi : Drachm. i. Dec, Hord : comp :
Unc : 1fs.

On the morning of the 15th he was in no respect better ; the opiate failed to give ease. The pain of discharging urine and the tenesmus were equally violent, and nearly half a pound of mucus had been discharged from the bladder in the course of the night. The draught was repeated with the addition of 10 drops of the Tinct. Opii. and the abdomen was directed to be well fomented with flannels, wrung out in a decoction of poppy heads, every fourth hour. In the evening we found him nearly in the same state, except that the mucus discharged appeared to increase. An injection of the Dec. Amyli. with Tinct. Opii. was now directed to be thrown up the rectum in the hope of procuring him some ease ; but it failed to afford even temporary relief, and he evidently became worse every day. On the 18th he was directed to take half a drachm of the Pulv. Uvæ Ursi. three times a day, in a draught of the compound decoction of barley. The opiate was continued, and various other remedies, as bark, balsam of copaiva, &c. were exhibited with no advantage, until the 28th, when his situation appeared so deplorable, that neither Mr. Lawrence or myself expected he could survive many days. I happened at that time to recollect, that you had somewhere observed, that the good effects of the aqua alkālina mephitica could not be referred merely to its solvent property, as relief was, in many cases of calculus, experienced soon after the remedy was taken into the stomach ; and as your observation seemed to imply a sedative effect, that I had not before supposed it to possess, I proposed as a last and forlorn resource the trial of it. It was determined that he should be immediately put upon its use ; but when it was considered, how much time would be expended in its preparation, we were obliged to resign the idea, as the poor man appeared to be too near his
end

end to admit of the necessary delay. His pulse was now so small as to be scarcely perceptible, and so quick as to make it difficult to reckon them; the mucus drain varied from two to three pounds in the day and night; and to his pain, which was very great at all times, but extremely so upon the contraction of the bladder after the discharge of either mucus or urine, and to his other bad symptoms, were now added colliquative sweats,—all of which when considered induced a belief, that he could not survive till it could be prepared. I then thought of the substitute that had been proposed by you for those to whom the *aqua alkalina mephitica* could not be rendered on account of its expensiveness. I mentioned it to Mr. L. and it was concluded that he should take it till the other medicine could be prepared, if he lived so long. Accordingly, two drachms of the dried soda was mixed with an equal quantity of the best soap, 12 drops of the essential oil of nutmegs, and the mass when made up with syrup was formed into 48 pills. He was directed to take four of them three times a day in a draught of the D: Hord: comp. At our visit on the morning of the 29th, when he had taken only three doses of his pills, we learnt with pleasure and surprise, that he had slept a little in the night, and that his calls to discharge urine had not been so frequent; and, in short, we ventured to hope that he was something better; our visit at night confirmed the hope of the morning. On the 30th we were told that he had slept more than he had done the preceding night, that the pain was abated, and that all his bad symptoms were alleviated. The next day (Oct. 1.) we were gratified by further proof of amendment: the mucus discharge was much diminished, the wasting sweats not so profuse, and his appetite beginning to return. From that time every thing went on well; and by the 13th of the month every inconvenient symptom, except an inability to retain so large a quantity of urine, as he had been accustomed to do, previous to the inflammation of his bladder, and except some remaining weakness, had compleatly left him. He has

con-

continued free from any return of such indisposition to the present day.

I have thus given you the history of a disease; that, in this instance, afforded a hopeless prospect, and that but too often disappoints the best directed efforts of the most skilful Practitioners; but which I am inclined to hope and expect, not only from the event of this remarkable though solitary case, but also from analogous effects in some that have since fallen under my observation, where the action of the membranes of the bladder appeared to be similar, and where the same kind of distressing symptoms were experienced, but where examination proved the existence of a diseased prostate in one instance, and calculus in two others,—that if the medicine be further tried, that a similar result will follow. Should it prove so, an additional remedy in one of the worst diseases will be added to the present limited number of those that *appear* to produce uniform and specific effects.

BRISTOL,

August 24, 1796.

I am, Dear Sir,

Yours,

THOMAS BAYNTON.

APPENDIX.

N^O. IV.

DEAR SIR,

IF all the circumstances of the following case were detailed, they would perhaps justify the sanguine expectations that I ventured to acknowledge I had formed of the almost infallible efficacy of the Soda Pills, from what I had observed of its effects in one case of dysuria mucosa that I gave to you at length, and some others that I hinted at in the close of the Letter that contained that communication; but I am at present so circumstanced as only to be able to give you an outline of the case, and a general account of the means that were made use of whilst he was under my care: I am however enabled to give additional weight to the relation, by the mention of his name; as he has very frequently solicited me to make known a remedy that he considers as having preserved him from an untimely Death.

Mr. John Henderson, of the Parish of St. George, Aged 55, requested me to attend him at his House at the beginning of August last, for a complaint of the Bladder and Urinary passages: Upon enquiring into his symptoms and examining the parts, I learnt that he had passed his water with pain and difficulty upwards of Seven Years, and that for a considerable time he had discharged more or less of that mucous material which I believe it is the peculiar and exclusive province of the membranes of the bladder to secrete; I also discovered that about midway between the scrotum and the Anus there was a considerable fulness of the perineum, and that one side of the scrotum was larger than the other in consequence of a thickening of the Tunica Vaginalis, upon which I enquired if he had at any time received a blow or other violence upon those parts; he told me that about seven or eight Years before, he recollected to have fallen

when on shipboard, upon that part of the ship that is called the rough tree, and that as those parts were then struck he thought it possible, tho' he felt but little pain at the time, that the foundation of the injury might have been then laid, more especially as he had since that time been subject to Hydrocele, and had been tapped twice on that side of the scrotum which I had observed to be thickened; this led me to enquire what assistance had been afforded him, and by whom it had been rendered; he mentioned the names of four Gentlemen that had attended him *singly* the greatest part of the time that he had been indisposed; he said that he had taken so immense a quantity of medicine with so little advantage, that he had determined never more to apply to any medical Gentleman, and had been prevailed upon to consult me against his inclination by the importunity of a friend.

Such an account would have discouraged me if he had mentioned the names of Gentlemen that I had not known, at a season like the present when the sources of information are accessible to all; but as it happened that I was personally informed of the superior ability of those that had been consulted, I could not but have despaired of being able to afford him any assistance if I had not been so lately convinced of the powers of the Soda in similar cases. Symptoms of stricture in the Urethra induced me to endeavour to pass a Bougie; and I discovered that the canal was obstructed by the tumor in the perineum; the information thus obtained, induced me to consider the affection of the bladder as a mere sympathetic action that was kept up by the irritation that was given to the Urethra and the Bladder by the tumor in the Perineum; I therefore applied Leeches to it as often as the Patient's strength would allow, and attempted by the application of cold and other auxiliaries to procure its resolution; the event was contrary to my expectations, and a disease that had so long remained in an indolent state became active and suppurated soon after the above means were applied to produce its resolution; it was allowed to break, as it pointed in a depending part, and after

a considerable slough had separated (tho' the Urine passed for some days through the wound) in the course of three or four weeks it healed, with no other treatment than light superficial dressings and frequently repeated warm poultices applied over them; the obstruction was now removed, and I hoped the effect would cease as the cause no longer existed, but in this also I was mistaken, as it was afterwards continued by Habit, as Mr. Hunter would have said, and much pain experienced with frequent and distressing Mucous discharges. It will not be wondered even by those who have seen how much I have been indebted to the Soda that I still should suppose Opium the best adapted remedy for *pains* that were occasioned by an obstruction in the Urethra, or that I should pertinaciously continue to exhibit it with the hope of its *alleviating* my Patient's sufferings; but I am obliged to declare, that although some relief was obtained by its use, I was compelled by the progression of the disease to apply again to the Soda: Again its good effects were astonishing, and by its use alone the Patient, after trying under my care many remedies, and under the direction of the other Medical Gentlemen, *perhaps* all that science could suggest, has been restored to his Family in almost perfect health, with no other remaining inconvenience than a slight disposition in the disease at times to return, which his pills always remove very soon after they are taken. Any other particulars Mr. H. will at any time be happy to satisfy you in.

I am, Dear Sir,

Your sincere Friend and Servant,

THOMAS BAYNTON.

Nov. 6, 1796.

NOTE by the EDITOR.

I Formerly published (*Obs. on Calculus. Murray, 1792. p. 24.*) the case of Mr. D. Lloyd, who had intense fixed pain in his loins, and discharged mucus with his urine, but never any gravel; and was wonderfully relieved by sal sodae. That case, with the two preceding, render it probable that alkalis in relieving calculus, act on the mucus membrane rather than as solvents; and they would much confirm the opinion of Drs. Darwin and Austin on the nature of calculus, if the opinion needed confirmation. In the *Med. Commentaries* for 1795 there is an account of a diseased bladder with mucus discharge, cured by injections—first, of oil and lime-water with watery infusion of opium, and afterwards of solution of vitriol of zinc and mucilage with infusion of opium. In that case alkali does not, from the account, appear to have been tried. It would probably have succeeded, and should always be exhibited before recourse is had to injections into the bladder.

APPENDIX.

N^o. V.

NOT many days after the receipt of Mr. Scott's paper on nitric acid (No. II.) the Editor was consulted on a singularly obstinate case of supposed Lues Venerea. Above ten months ago, the patient had slight gonorrhœa; and after the use of some common remedies he thought himself nearly well, when a small ulceration appeared on the *glans penis*. I am not informed whether this ulcer shewed the characteristics of chancre; but by the advice of an experienced practitioner, he now took the mercurial pill night and morning, and rubbed in mercurial ointment. This course was continued for near eight weeks without any foreness of the mouth, or amendment of the ulcer. In about four months from the first seizure, under the continuance of the same plan, an ulcer appeared in the throat, and the medicines were exhibited more largely for six weeks—and he was at the end of this time rather worse than better. The patient was now confined to his apartment, and mercury used more vigorously in both ways. In the course of five weeks the ulcer was reduced to a third of its former extent; its pain had subsided, and the gums felt slightly sore. After this time, the chancre(?) was in a fluctuating state, sometimes healing rapidly, and then spreading to its original dimensions; nor was any farther advance made towards a cure, though corrosive sublimate was employed alternately with other preparations of mercury. Eight months after the first attack, there was observed, near the fore, a gangrenous spot; having nothing of the appearance of a spreading venereal ulcer, but exactly such as is sometimes seen after long mercurial courses. The mercury was reduced; cicuta applied, and taken with bark and sarsaparilla; a grain only of cal-cined mercury being given at night, with half a grain of opium.

The Editor produced Mr. Scott's paper, and recommended a trial of his method, to which the patient and his friends cheerfully consented. The nitric acid was accordingly taken with perseverance for six weeks, and for a time to 200 drops a day. Meanwhile the ulcer rather extended than diminished; its surface looked cleaner, but no tendency to incarcination appeared. Immediately on taking the acid no sensation was felt in the stomach, either pleasant or otherwise, except during the first, second or third days, when it griped a little—No increased warmth of the skin—no effect on the pulse. The night-sweats (which were certainly less after the mercury was reduced, and the bark and farfaparilla employed) declined rapidly, after the acid was begun upon.

The acid being now gradually reduced to 80 drops a day, its inefficacy in this case became too apparent. The ulcer suddenly put on a worse appearance, and increased rapidly. Inflammation of the found part of the glans, and a degree of phymosis succeeded.

Opium with bark has been since advised upon the supposition that the ulcer is a mere ill-conditioned ulcer, and now no longer of a venereal nature, whatever it may have been before the employment of mercurial medicines.

CASE of Mr. H.

DEAR SIR,

I RECEIVED your obliging favour on the day it was written, and perceive by its manner that you are as much and as agreeably surprized by the information Mr. H.'s Letter to me affords, as I expected you would be. I think with you that the Public ought to be made acquainted with the history of his case, together with the contents of his Letter; and as I have personally witnessed what he has recorded, I should have to accuse myself of inhumanity, if I were to suffer any personal considerations, that respect either my time, or my unwillingness to appear so often as a narrator of uncommon cases in one pamphlet, to prevent my furnishing you with
all

all the particulars within my knowledge. I therefore with cheerfulness and pleasure undertake to give you, as far as I am able, with the assistance of my day-book and recollection, the account of a case that you say will conclude your pamphlet, "and make a noble conclusion." But as it may be asked how I came to be acquainted with the effects of the remedy before its publication, it may not be amiss for me to state that, when Mr. Biggs, your Printer, furnished me with the proof-sheet for revision that contained the account of Mr. Henderson's case, I was struck with Mr. Scott's communication which occupied the preceding part of the same sheet; and as soon as an opportunity permitted, I informed you that I had a venereal patient under my care, whose case had resisted mercury in almost every known mode of exhibition, and that I should wish to try the nitric acid as there recommended, and requested that I might be favoured with your company when I visited the patient the next morning, as well to assist me with your opinion respecting the appropriate dose, &c. as to give you a demonstration of the case being almost as bad as ever had been observed by any practitioner. You obligingly promised to be with me at nine in the morning; but about that time I received a note from you, wherein you informed me that a professional hindrance would prevent your being with me, and that upon reconsideration you thought the reasoning of Mr. Scott, who refers the advantages obtained "to oxygenation of the system," so unsatisfactory, that you would advise a very doubtful prognosis to be given to the patient, if he were put upon a trial of it. I was so much influenced by your opinion, that I should have omitted to make use of it, had I not the preceding evening shewn my patient Mr. Scott's account, and told him that he might expect a visit from you in the ensuing morning. A man in his situation, that had for nearly two years experienced the inefficacy of what he had been frequently told was the whole of the known remedies that the art afforded, was not likely to give up the use of that which was asserted to be a tried remedy

in another part of the world, though it was unknown in this; and although I made him acquainted with the contents of your note, he was no way discouraged, but earnestly petitioned for its immediate exhibition. I have thus stated in a plain and candid manner the way in which I was led to its use. And if there should be any person, who, after what has been said, can suppose that any mistake in the nature of the case, or misrepresentation of the facts can have happened—or (which is more agreeable to believe) if any gentleman should wish to ascertain in a more particular manner the facts that preceded and accompanied the administration of a remedy of so much apparent importance in a disease so hopeless, I am happy to say, that my patient's very laudable humanity would induce him to sink the consideration of what he might feel in satisfying such enquiries, in the hope of assisting by his confessions some unhappy fellow sufferer.

On the 8th of February 1795 I was requested to visit Mr. ——— with pains of the limbs and ulcers of the throat and tonsils, which from appearances suspecting to be a case of cynanche maligna, induced me to prescribe bark wine, and gargles. That plan was persevered in until the 19th without any advantage. From that circumstance, conjoined with the situation of his pains and the times of their aggravation, I began (though my patient was married, and the father of healthy fine children) to suspect the case to be venereal; and after expressing my suspicions, I learnt from him that he had contracted such a disease some years before, and had at that time an ulcer on the penis; but that he supposed himself perfectly cured, having passed through a regular course of medicine for that purpose: it was with difficulty that I convinced him that his present sufferings were referable to such a cause. However, possessing his confidence, I prevailed upon him to commence a mercurial course, and he continued to take from that time to the 8th of March a grain of calomel, with an equal quantity of the ext. papav. three times a day, in the third part of a pint of the decoct. lignor

lignor cum rad. mezerii. On that day, in consequence of the appearance of some eruptions, the form of the medicines was exchanged for the following

R. Hydrarg. Muriat. gr. iv.

Aq. cinnam. ℥iv. m cap. coch. larg. noct. mane q.

This was continued until the 27th of April, and then a drachm of the *ung. hydrarg. fort.* was ordered to be rubbed into the thighs every night at bed-time, and the former medicine omitted on account of the eruption having yielded, though the pains had increased: this, with the decoction of the woods and *mezerion*, was continued till the middle of June. On the 20th of October he began to take four grains of the blue pill with a quarter of a grain of opium three times a day; and it was continued without intermission until the middle of January 1796. On the 14th of that month calomel with opium were again used in its stead, and continued until the middle of February. On the 12th of July he again commenced its use, and continued to take it until the middle of August last, when I was obliged by the fullest experience of the inefficacy of all the mercurial preparations that had been tried, to again request him to desist from the use of all medicines, except occasional opiates to mitigate his pain, which it had been necessary for him to use with the greatest freedom during the whole of the mercurial course. It will here be necessary to remind you, that when I first was called to his assistance I found him labouring under only the constitutional or secondary symptoms of the disease; and as I did not keep any minutes of the case, I cannot speak with that exactness I would wish of the particular effects of the different preparations of mercury that were exhibited. But I have the fullest recollection, that the ulcers of the throat and the affection of the skin were removed in due time by the means that were adopted; and although there was a complete failure in my attempts to dislodge the poison from the bones, I am not convinced that the failure resulted from the incompetency of the mercury to produce such an effect—as the constitution of this patient was rendered
so

so irritable by the disease, or the means made use of, (or perhaps both) that I was never able to impregnate the system with a sufficient quantity to produce the desired effect; though it was exhibited with every precaution, and united with every corrective that my judgment could suggest, conjoined with the advantages of country air, bark, milk diet, and the occasional omission of all medicines, which for a time answered so well, as to make my disappointment the greater at each time of the disease returning. At last, medicine of almost every kind failed to afford even relief, and I was reduced to the necessity of being content with the mere palliative effects of opium given in large doses. The peculiarities of this case are however too common; and every practitioner that is much engaged in a large city, especially if it be a sea-port, must have had to deplore such occurrences. It was my good fortune to meet with Mr. Scott's communication, in the way before described, just at the time when I had exhausted my endeavours to cure this patient—and when I say with him, that he was indeed a “rueful spectacle,” with little more than diseased bones remaining, when he began the use of the nitric acid; and that he now appears in good health, I contemplate with astonishment the change that has been produced: more especially as he was always labouring under profuse sweats, diarrhoea, or ptyalism, from the mercurials that were exhibited, though they were so guarded; and has now obtained a cure by the use of a most powerful acid, without experiencing even momentary inconvenience, and in less time than would have been requisite to remove even the mildest symptoms of the disease by any other known method. How much will the pleasure, that the effects here related have afforded me, be increased, if the future experience of my professional brethren should coincide with what was observed in this very melancholy case: and that it may prove so in cases that are similar I entertain the greatest hope, as the effects appeared to depend so fully upon the assigned cause, that no doubt can possibly remain upon my own mind of the acid being the true and only cause of the changes that followed. It will be recollected that the poison had in this case

observed its accustomed laws, and after traversing the system, and successively displaying its character upon the genitals, fauces, and skin, it had affected the bones; from whence most practitioners have found it difficult, and sometimes impossible, to dislodge it. Perhaps it may not be difficult to conceive that a remedy, possessing such chemical power, and having so strong an affinity for the matter that analysis tells us constitutes bone, may produce a cure in this species of the disease, and not be attended with equal effects where only the soft parts are affected by the poison. That this stage is the most difficult to remove, and that it is often impossible to accomplish it, I have before said, is known to most practitioners. May this remedy supply the desideratum of this branch of the healing art, and the name of your correspondent Mr. Scott will then be deservedly remembered by every friend of science and improvement. Why should it be so difficult to believe the existence of other specifics for the poison in Europe, when it is recollected that the South-sea islanders, and some tribes of the native Americans have found in the vegetable productions of their countries remedies for the worst states of the disease?

I have thus endeavoured to comply with your request as fully and particularly as the circumstance of my having kept no minutes of the case will allow me; and as the recollection of the patient will be long kept alive by what he has suffered, I think that his own letter may be as satisfactory as any account from me of the situation he was in, when he first made use of the medicine that has occasioned his cure. And I can safely assert that I believe his account to be a most faithful representation of his situation. You have seen it in his own writing, and he has been taught to expect a visit from you. I therefore request that you will at an early interview with him oblige me by satisfying yourself of the whole of what is here asserted; and then, if it be in time for your pamphlet, subjoin your testimony to that of

Your sincere Servant,

THOMAS BAYNTON.

Nov. 28, 1796.

To Dr. BEDDOES.

DEAR SIR,

PURSUANT to your request at your last visit, I take my pen to describe (if possible) the deplorable condition and sufferings I have endured for near two years last past, and the almost miraculous deliverance therefrom by your care and unwearied attention thereto.—I was first seized with ulcers of my throat and violent pains in my shins at night, that threw me into such perspirations, that for nine or ten mornings I was under the necessity of changing my linen before I could possibly get up; which was soon followed by or with excrescences or nodes from my knees almost down to my insteps, attended with violent pains in my head. My arms also were attacked with excruciating pains, where swellings of a considerable size made their appearance. My knees also swelled, and the pain so acute, that I durst not move them the least aside: sleep fled—nor did it return for ten weeks. And for twenty-two weeks I could not bear to be moved without suffering the most extreme torture, notwithstanding your tender care to administer every thing you could devise and prescribe for my relief. I knew you perfectly understood my case; but my disease seemed to baffle the power of medicine and every effort. Having for the then last thirteen weeks lived wholly upon milk, you advised me to discontinue the medicine, in hopes I might soon be able to make use of stronger food, and recover a little strength. This treatment had the desired effect: and my pains for some time seemed to abate; but, alas! they soon returned again! when you advised another course of medicine, which operated more powerfully than it hitherto had done, and in a few months restored me so as to enable me to walk from my lodgings in the country to town. The satisfaction you expressed on the occasion I shall never forget, and with myself was in hopes of a radical cure. But at the end of three months my hopes were destroyed by a violent relapse, which soon confined me to my bed. My legs (if possible) were worse than before;
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for not only my shins, but the main bones pained me dreadfully. One node formed (a little below my right knee) in a short time almost as large as an hen egg. The pains from my shoulders to my fingers ends I can scarcely describe. The sinews of my arms, thighs, and legs stiff and contracted—my fingers I could by no means bend; they were fixed by disease, and every joint swelled. The bones of my head shared equal with the parts I have described; and nothing but death was expected to put a period to such a scene of misery. Added to this, my body was a rueful spectacle, a mere skeleton; so that disease had nothing left but my vitals for its prey. This, Sir, is a faint description of the state and condition you found me in about three weeks ago, when you visited me, and with joy in your countenance told me, a new discovery had been made of a medicine that you had great hope would reach my case; and with your wonted goodness of heart cheered up my drooping spirits by describing to me its mildness and efficacy in several cases similar to my own. Encouraged by this information, and relying upon your judgment, I was determined to give it a fair trial. I began; and continued to take the quantity as prescribed.—At the expiration of seven days I found it begin to operate, as you had before described, by creating a saliva in my mouth. On that day I had a desire to be lifted from my bed, and to sit up a little, which was done with some difficulty; but could not bear my feet on the ground, my knees also being in a very debilitated state—but found my pains greatly abated. I spit a great deal the next night, which was very thin, and not disagreeable. On the eighth day my pains seemed quite gone; and requested again to get up, when to my great surprize I found myself capable of bearing the weight of my body on my legs. On the ninth day I was capable and absolutely walked from my bed to my chair, the distance of six feet, without assistance.—I bespoke a pair of crutches, but, thank God, I never used them, nor have had occasion for them; for on the tenth day I walked several times backwards and forward my room

without crutch or stick, or any other assistance whatever. On the eleventh day I walked from one room to another, and finding it attended with no extra pain, but stiffness and weakness in my shins, I absolutely walked up a pair of stairs of fourteen or sixteen steps, and down again. My appetite was now restored to an amazing degree, insomuch that I found I could not continue the usual quantity of medicine (which in fact seemed to have operated more like a charm than a medicine) but I continue taking about three parts in four thereof daily. And I have the pleasure further to inform you, that I have walked out several times, and yesterday in particular I walked more than a mile, and was in hopes to have surprized you (which I know would have been an agreeable one) by paying you a visit at your own house; but was informed you was from home.—Be assured I shall always esteem it a pleasure to answer any queries respecting my case, and the efficacious operation of the acid in so wonderful a cure.

Believe me to be

Dear Sir,

BRISTOL,
Nov. 25, 1796.

To Mr. BAYNTON.

Nov. 29, 1796. The Editor in company with another person met Mr. H. at Mr. Baynton's. Mr. H. by word of mouth confirmed the preceding statement; and added a variety of particulars respecting his former and present state. He said that his daily dose of colourless strong nitrous (nitric) acid was two drachms, diluted by a quart of water. The mixture produced no immediate sensation in the stomach. He was never griped by it; and he thought it rather astringent; for he had no stool in three or four days after beginning this course, which was unusual with him; but he would not take any aperient medicine, that nothing might interfere with the acid. On the seventh day he perceived a flow of saliva; on the

eighth the salivation amounted to a quart ; and it has continued in a greater or less degree ever since. There was no soreness of the mouth, or any of the feelings which had formerly been produced by mercury. In two or three days after this effect on the salivary glands, he lost his night pains. On being lifted out of bed, he was astonished to find he could stand without support, "whereas" said he, putting his hand on his knee, "these limbs could not before "have sustained a single ounce." The nodes, which were of the size of a hen's egg on the tibia, and of which there were several on the back part of the humerus and radius of one arm, began to diminish. The Editor, who had this interview three weeks after the first exhibition of the acid, found the tibiæ rough, but without excrescence ; all the nodes having disappeared. Mr. H.'s nose, which had been considerably enlarged, was now of the natural size. His hands, which had been "a mishapen mass," had no preternatural appearance. Before, he could not bend any of his fingers ; now he could bend them all, but the forefinger of the right hand. A great difficulty of deglutition had disappeared at the commencement of the salivation. His general bodily condition had been much amended, and his appetite had become so keen, that he could hardly find time enough in the day to eat and to take his diluted acid.

This account fully confirms an important part of Mr. Scott's assertions. And the effect of the nitric acid in the instance of Mr. H. furnishes an additional probability that the first case in this Number was not venereal, when the patient began to take the acid. The result of that case goes some way towards determining the limits of its power, which cannot however be fixed without a number of experiments. The Editor has the pleasure to add that he has before him a letter from an accurate medical observer, in which he says that "he has used nitric acid with great advantage in some cases which he believed to be hepatic, and in one venereal case with apparent advantage."

An ingenious friend had conjectured from Mr. Scott's paper, that nitric acid only renders the sys-

tem susceptible of the mercurial stimulus. But Mr. H. took no mercury between the middle of August, and the second week in November. In the effect too on the mouth Mr. H. remarked a striking difference.

The Editor flatters himself that to have ascertained the mild action of the nitric acid in these two cases, and its effect in checking night-sweats in the first, will, in all likelihood, prove advantageous to medicine in various respects. The personal examination of Mr. H. has put it out of his power to doubt of the utility of Mr. Scott's practice. He reckons its success among the fruits that were to be expected from the cultivation of the pneumatic physiology. He felt from the first that his particular speculations were precarious, and he some time since gave up his supposition relative to the state of the system in consumption. (*See second Edition of parts I. and II. of Considerations*). But he was confident that if he could fix the eye and the mind of his medical contemporaries on those agents, upon which the mechanism of life so immediately depends, they would not fail speedily to acquire much of that power, which the knowledge of nature confers.

The discovery of every new *specific* (or substance capable of correcting given morbid actions of the system) affords a new reason for believing in the existence of others. For some scrophulous ulcers we seem to have found a new specific in sorrel; for venereal and hepatic affections in nitric acid, such as we possessed before in mercury. These are diseases, in themselves not many degrees less formidable than cancer and consumption. We have analogies enough to persuade us, that there is no lesion of organization, induced by the powers of the living body modified in one way, which the same powers, differently modified, may not repair; and that, by dint of frequent ventures, some happy hand will draw from the lottery of Nature a remedy for each of those diseases, which at present most baffle the physician and torture the patient.

APPENDIX.

N^o. VI.

Extra& from a Paper, entitled *Instruction concerning the means of preserving salubrity, and purifying the air, in the military hospitals of the French Republic, as it appeared in the Journal de l'hygiène, Ventose, an 2^e ère franç.*

AU nombre des moyens que la chimie a employés avec un succès qui tient du prodige, pour opérer cette dépuracion (des lieux infectés), nous citerons le procédé que *Guiton*, représentant du peuple, a mis en usage en 1773, dans la ci-devant cathédrale de Dijon, infectée par des exhumations, au point qu'on fut obligé de l'abandonner.

Ce moyen consiste à répandre dans l'atmosphère, de l'acide muriatique (acide marin) en état de gaz, dégagé par l'intermède de l'acide sulfurique (huile de vitriol). Voici le procédé pour désinfecter une salle de 40 à 50 lits.

Après avoir évacué les malades sur une des salles de rechange, disposez dans le milieu de la salle vuide, dont les fenêtres & les portes seront fermées, un fourneau garni d'une petite chaudière ou capsule de fer à demi remplie de cendre tamisée sur laquelle on posera une capsule de verre, de grès, de fayance même, chargée de neuf onces de muriate de soude (sel marin) légèrement humecté, avec une demionce au plus d'eau commune.

Le feu étant allumé & la capsule échauffée, on versera sur le sel marin quatre onces d'acide sulfurique, ou huile de vitriol du commerce. En un instant l'acide sulfurique agira sur le sel marin dont l'acide se mettra en expansion, L'opérateur qui sera le pharmacien en chef, ou un de ses aides versé dans le manuel des opérations chimiques, se retirera en fermant la porte sur lui & emportant la clef.

Douze heures après on entrera dans la salle. On ouvrira portes & fenêtres pour établir des courans d'air, & évacuer celui qui pourroit être encore chargé d'acide.

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On donnera une plus grande latitude d'utilité à ce procédé en l'appliquant aux salles même remplies de malades, toutes les fois que les Officiers de Santé le jugeront nécessaire. Ainsi, lorsqu'on aura reconnu que l'air d'une salle est surchargé de miasmes animaux, & a besoin de cet excellent purificateur, il suffira de faire le tiers du mélange ci-dessus & même moins, & de la parcourir plus ou moins lentement et dans tous les points, le réchaud à la main, au moment où le gaz se met en expansion. Lorsque la salle sera jugée suffisamment remplie de gaz acide muriatique, on transportera l'appareil dans les latrines, afin que les dernières portions gazeuses que le mélange pourra continuer de fournir, servent à neutraliser les gas ammoniacaux putrides qui se développent continuellement dans les privés.

Cette opération qui n'occasionne aucune sensation désagréable ni incommode, suffira néanmoins pour sanifier une salle; & on pourra l'employer tous les jours. & même plus souvent d'une manière partielle, dans les salles où un ou plusieurs malades affectés de gangrène ou de quelque autre maladie putride, répandroient des miasmes dangereux. Dans un cas d'urgence, s'il se trouve dans la pharmacie de l'acide muriatique concentré (acide marin fumant) on obtiendra le même effet en portant dans les salles la bouteille ouverte; & si cet acide n'est pas assez concentré, on le chauffera pour le réduire en état de gaz. Enfin, on répétera ces différens procédés toutes les fois qu'il sera jugé nécessaire par les officiers de santé, ainsi que cela se pratiquoit pour les inutiles & même dangereuses fumigations aromatiques.

Fumigations with mineral acids must, like the telegraph, have been introduced into the British military system. But Dr. J. C. Smyth has earned a civic wreath by first labouring to introduce them, though here the trials took place near two years later than they were enjoined by public authority in France; and his experiments on the respirability of the copious fumes of marine or nitric acids were not, I understand, made before July or August 1795.—When Dr. Smyth however lays claim to the merit of more exact, early, and comprehensive views, it is more than doubtful whether his pretensions will be admitted by the impartial historian of medical science. The Doctor descends to carping objections, and he strains

strains very hard to establish distinctions in doctrine and practice between himself and the French physicians. I have above been at some pains to enable the public to judge whether these distinctions are just: and I shall here produce what I consider as no trivial misstatement of the opinions of the *council of health*. "The French physicians" says Dr. Smyth, "appear to me to have fallen into a considerable mistake on this subject in taking the quantity of carbonic acid present in an hospital as a TEST of the quantity or malignity of contagion, when, in reality, they are two things totally distinct from each other." (pp. 204. 205.) In a note he adds, "The method proposed by the French physicians for ascertaining the quantity of carbonic acid is simple and ingenious." Take two phials: let one be filled with common water, the other with lime-water. At the place where you want to try the purity of the air, empty the phial of common water, then filling it half-full with lime-water and corking it, shake the phial for some time: the quantity of sediment shews the proportion of carbonic acid. But to render the preceding experiment conclusive, the height from the ground at which the air is taken should be stated; otherwise we are liable to great fallacy."

Now as the great point to be ascertained is the condition of the air which the patients are breathing, it happens that the authors of the *instruction* have been much more judicious than if they had assigned a certain height. They direct the air to be taken near the bolsters of the beds. *Dans les angles & vers le chevet des lits des malades*. They doubtless knew of Mr. Lavoisier's experiments on the air of crowded rooms, taken at different heights, and could have applied them, had the occasion been proper. There is however a just exception (and it is mentioned by Mr. Lavoisier as rendering the experiment abortive) to their method. A quantity of carbonic acid air is absorbed by the common water, as it issues out of the phial.

The French council (and here is the misstatement) by no means speaks of carbonic acid as any TEST of con-

contagion. They properly employ a loose expression. *Il parait très-vraisemblable, d'après les nouvelles connaissances sur la nature des gaz, que dans les salles suspectées d'insalubrité, les miasmes putrides sont toujours accompagnés d'une assez grande quantité d'acide carbonique.* (p. 170.) They seem here to hold in view places, where animal substances have fermented, full as much as those where the sick breathe; and it is true that in both there will be "a good deal" of carbonic acid air, particularly in the former, as the meritorious researches of Mr. Lavoisier have so fully proved.

The foreign philosophers will assuredly not deem it worth while to examine the book of their *would-be-critic* with a prying pick-fault eye. But they will smile to find one who is perpetually either ignorant or mistaken concerning familiar chemical facts, presuming upon "those improvements, which a more accurate chemistry, and a long attention to the subject have suggested to him." (On Jail-distemper, p. 181.) The uninstructed may be amused by observing how he hunts oversights, splits hairs, publishes what he acknowledges to be a superfluous exhibition of his own merits,* and anxiously calls to his aid every little art, by which the interest of his vanity may be promoted. The substitution of nitre for common salt was a good, though obvious, thought, and seems to have answered excellently. But what there is of discovery—viz. the having strictly ascertained that acids will destroy contagion, and the process for extricating the fumes—properly belongs to Mr. Morveau. Otherwise, should any one try fumes of *acetic* acid, if he finds the progress of infection stopped, he too, if he should chuse to assume a self-trumpeting tone, may claim to be a discoverer; and he would have to say that his predecessors strangely overlooked *acetic* acid, though of all acids the most agreeable and reviving to the sick.

* *Memorial to Lord North* (p. 227), of which he says, "others (besides his friends) "may consider it as so many blank pages," and in which he tells Lord North "how during the intervals of the operation of a violent emetic, he continued to dictate instructions to the surgeon being apprehensive lest the "fever" should seize his head. (p. 234.)

APPENDIX.

N^o. VII.

Extract from a Letter on Femoral Hernia:

DEAR SIR,

I HAVE great satisfaction in saying, that Captain Hemmley has, ever since I wrote last, continued gathering strength. I saw him a few days ago, when he assured me, he entertained little doubt of speedily reassuming the command of his vessel.— I should have written to you some time ago, had it not been that I wished to communicate the following case: Being called to a consultation in a case of crural Hernia, which had been strangulated for a week, and had resisted every effort of the Taxis, there remained no other means but the operation. The Gentlemen attending having requested me to perform the operation, I assented, and determined to profit by the very judicious observations, and accurate description of the parts, as given in your Translation of *Mr. Gimbernat's New Method of operating for the Femoral Hernia*. Johnson.—My subject was a Female near sixty years of age, the Hernia was on the right side, and contained a portion of the ileum. After having opened the sac, and made every prudent effort to reduce the contents without success, I dilated the internal edge of the ring in the manner recommended. This enabled me to replace the contents of the tumor. I then treated the wound by suturing and superficial dressings: A large opiate given in alcohol immediately after the operation steadied the stomach, and a few grains of calomel in pills procured a discharge by the bowels. From the moment of the operation no untoward symptom took place. The wound suppurated kindly, and in less than three weeks was perfectly healed.

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I have before performed this operation, when I divided the upper part of the ring. My patient recovered perfectly, and has remained well ever since—now three years. Yet I own I prefer Mr. G.'s mode on two accounts. There is less danger of dividing an artery of consequence (which so situated is always difficult to take up)—and the parts necessary to sustain the viscera are less injured. These are weighty considerations.

I am, &c.

E. KENTISH.

Newcastle, Nov. 1, 1796.

APPEN-

APPENDIX.

N^o. VIII.

BOWOOD, near CALNE, Oct. 1796.

CASE OF CONSUMPTION.

JOHⁿ HIGHET aged 22 (whose father and two Sisters died of a pulmonary consumption) having over-heated himself 18 months ago, got a spitting of blood, which was followed by a suppuration in the left lobe of the lungs. He coughed very violently, and spit a vast quantity of pus. He wasted gradually away, so that he could scarce move about, and was obliged to quit his business, which was that of a journeyman taylor. He was advised by an old man (who had since forty years directed the lime-kiln in Bowood park, and who told him that about ten years ago a nobleman was cured by this lime-kiln,) to inspire every day during an hour the smoke of the kiln. He immediately did it and found almost instantaneous relief by it; the spitting changed in a few days from a purulent matter into a clear transparent mucus, his cough and pain diminished, the hectic fever abated; and he felt instead of heat, rather a chilliness or cold: his flesh returned with his appetite and strength, his countenance changed from a sickly appearance to a healthy look—the pain which he felt near the heart shifted to the ribs, where he finds since that time a continual uneasiness, which increases into a painful sensation when he lies on his right side, which I think comes from the lung being attached to the pleura of the left side. In about three weeks he seemed nearly cured of the consumption.

The manner of inspiring the smoke, (I assisted more than once at the operation) was to put his head
over

over the lime-kiln at the place, where, by poking a hole in the stones with an iron pointed bar as far as the living coals, a thick yellow smoke issued so as to conceal the whole head from the sight of the bystanders. He inhaled this smoke with mouth and nostrils open during a whole hour every morning.

A medical gentleman thought this cure to be performed by the inflammable gaz produced by the coals and by the fixed air mixing with the inflammable; but I doubted much of the foundation of this opinion, as inflammable air must very likely be consumed by the fire of the living coals at the very time of its production.* I think it more probable that the effect was rather owing to the smoke carrying with it the balsamic tar infinitely divided in its volume, which is for the greatest part tar itself. The healing quality of this smoke was not owing to any mixture of carbonic acid or fixed air, produced by the calcination of the stones into lime; for the same patient found also a great relief by inhaling the smoke of pit coal by a common fire.

It might be reasonably doubted, whether all pit coal would produce the same salutary effect, for the nature of pit coal from various mines is very different; some containing a great deal of sulphur, pyrites, alum, and various other ingredients. Those that contain sulphur would probably prove very hurtful.

I did what I could to procure some more patients labouring under pulmonary consumptions, as also ulcerated legs, or some diseases of that nature, to try whether this smoke would not cure them as readily as it did cure the above-mentioned patient; but I could procure none. It is however well known, a long while ago that lime kilns have had the reputation of curing various diseases, principally pulmonary consumptions. I believe it worth while trying, to let the patients inhale the smoke of pit coal from a common

* Heavy inflammable air would, I apprehend, be plentifully distilled from the heated, but uninflamed, part of the coals. I am however disposed to agree with Dr. Ingenhousz as to the curative operation of the tar in vapour. *Editor.*

common fire. But I should not advise to inhale this smoke in a concentrated state, issuing from these coals heated in a retort ; as in this case a very concentrated inflammable air mixed with the smoke may do injury. However, it may be tried with prudence.

By placing in the middle of the lime kiln flat vessels filled with lime water, and others filled with a solution of turnsol, I found that in half an hour the lime water was scarcely precipitated any more than it was at twenty feet distant—that turnsol was not changed at all in colour. But in half an hour I found the oleum tartari per deliquium, rubbed against the inside of a cylindrical glass, crystallized into acicular crystals, as it crystallizes in a brew-house or where beer ferments. An equal quantity of these coals and lime-stone distilled in a stone retort, gave a vast deal of fixed air mixed with very concentrated inflammable air and smoke. The inflammable air burned with a brilliant flame in a cylindrical glass, in which it was received from the retort. The sides of this glass were all lined with a coat of semi-transparent tar.

J. INGENHOUSZ.

NOTE.

NOTE.

The Editor has been well informed of another French lady (now in England) believed to be phthical, and cured by Dr. Saiffert's method of cows. This lady lived six entire weeks with the animals. He has heard a third case mentioned. It was perhaps the celebrity of these facts that led Mad. Genlis to mention the method in her *Veilleés du Chateau*. It seems therefore that the practice was followed up, and with a degree of success. It is singular that the medical chemists of Paris should not have noticed it.

E R R A T A.

P. 152, l. 9, for *was* read *were*—l. 22, for *canel* read *coerul*.
 P. 35, l. 9, dele "*to support*," and correct some other inessential errors.

N. B. The plates are numbered in continuation from Mr. Watt's plates in Part II, and there are only two (viz. Pl. IV and V) belonging to Parts IV and V of these Considerations.

E N D.

